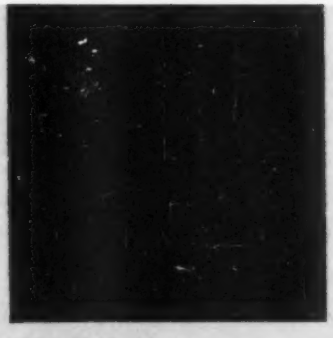
JOURNAL OF SPEECH AND HEARING DISORDERS



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General Information

The American Speech and Hearing Association publishes the *Journal of Speech and Hearing Disorders*, the *Journal of Speech and Hearing Research*, *Monograph Supplements*, *Trends*, and *ASHA*.

The *Journal of Speech and Hearing Disorders* is devoted to articles dealing with techniques of evaluation, clinical research, case studies, therapy and re-education in disorders of speech and hearing. Manuscripts and related correspondence should be sent to Mary Huber, Editor, *Journal of Speech and Hearing Disorders*, Department of Speech, Los Angeles State College, Los Angeles 32, California. The Association reserves the right to keep any manuscripts and cannot assume the responsibility for their loss. Papers which have been printed elsewhere should not be submitted. Before preparing manuscripts, authors are advised to consult 'Information for Contributors to the *Journal of Speech and Hearing Disorders*' and 'Examples of Manuscript Form' (*J. Speech Hearing Dis.*, 26, 1961, 99-106). Copies may be obtained by writing the editor.

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Call for Program Suggestions and Papers Thirty-seventh Annual Convention of the American Speech and Hearing Association

November 5, 6, 7, and 8, 1961, Hotel Sherman
Chicago, Illinois

The ASHA Convention Program Committee announces a Call for Program Suggestions and Papers for the 1961 National Convention. Contributors are urged to submit abstracts and other program proposals immediately to insure that they may be given consideration during the planning stages for the Convention.

The Program Committee will continue the efforts of past Program Committees to upgrade the caliber of the Convention presentations. Program proposals will be carefully screened. The time available for the program will be less and the number of presentations to be scheduled will be fewer for the 1961 Convention than for the 1960 Convention. Contributors must supply sufficient information to the Program Committee to enable it to make judicious choices from among the proposals and to permit intelligent scheduling of the presentations selected. Since the program abstracts and summaries will be published prior to the Convention, they must be complete and in suitable publication form.

The organization of a program for a national convention is necessarily complex. Scrupulous adherence to both deadlines and forms for submitting program proposals is necessary if the Committee is to work effectively.

The Program Committee urges your active participation in planning the program. Any suggestions will be given careful consideration. If you wish to make a program proposal of any type, please read carefully the instructions given below.

Types of Programs

In the interest of serving the many and varied needs of the membership, a number of different types of meetings and sessions will be scheduled. For the purposes of clarification and uniformity of listings, the following descriptions and definitions are provided.

Papers. Papers may deal with experiments, investigations, theoretical formulations, clinical practices, philosophic considerations, and policy or procedures in the various settings of our professional practice. Papers from related disciplines will be considered.

Symposium. A symposium is a meeting or series of meetings involving the presentation of two or more formal papers on a given topic.

Panel. A panel presentation is an informal discussion of a given topic by a group of five or six experts. There are no speeches per se and the chairman interjects just enough ideas to set the stage and to give direction to the discussion.

Forum. There are two types of forum: an open forum, which involves extended audience discussion of a topic that has been briefly outlined; and a panel-forum, in which a panel is used for defining the topic and participating in the discussion. In either type, a question period, with special interrogators or selected written questions, may be used to guide discussion toward important implications.

Workshop. A workshop provides a structured learning situation in which the audience participates with the aid of resource persons.

Qualifications for Participation

Both members and nonmembers may submit proposals and participate in the program. In order to insure maximum participation by the membership, the Executive Council has ruled that each individual be limited to two appearances on the program. This ruling has been interpreted not to apply to those instances in which individuals are invited to participate or where they are chairman of sections.

Requirements for Proposals

All proposals for the program, including abstracts, must be typed in quadruplicate and may not exceed 300 words in length. All communications concerning the program are to be addressed to D. C. Spriestersbach, Program Committee Chairman, Department of Speech Pathology and Audiology, University of Iowa, Iowa City, Iowa.

Obligations of Contributors

Persons accepted to appear on the program thereby assume the responsibility to appear in person as scheduled and to adhere rigidly to the time limits assigned. Participants must agree that no substantial changes will be made in accepted proposals without advance approval of the Program Committee. Should unforeseen contingencies arise which preclude the appearance as planned, the contributor must supply a substitute by advance arrangement with the section chairman.

Contributors assume the further responsibility to cooperate with the abstracts editor by meeting such deadlines as he shall indicate in making any revisions of abstracts and summaries deemed necessary. The Program Committee wishes to insure uniform coverage and quality of the published abstracts and summaries.

Form for Submitting Proposals

Identifying Data. These data are required of all proposals: (a) title of paper or program, (b) name and advanced degree of each participant, (c) name of the institution or laboratory with which each participant is affiliated, (d) designation of work which was done to satisfy the requirements for an advanced degree and identification of the director of the study, (e) identification of work which was done as part of a sponsored research project with name of the sponsoring agency and the project code number, (f) time required for presentation, (g) audiovisual equipment needed or special physical setting required. Participants are requested to consider carefully the advantages and disadvantages of duplicated handouts of graphic and tabular material over presentations by slide

projectors. However, projectors will be furnished if requested.

Form for Specific Types of Proposals. Contributed Papers. Research papers are proposed by submitting an abstract which contains a concise statement of the problem, procedures, and results. Results and conclusions should be stressed. All data should have been collected and the analysis completed at the time that the abstract is submitted. Papers concerned with data which have not been completely analyzed by April 1 will be considered only by special arrangement with the Program Chairman.

Papers dealing with matters other than research are proposed by submitting a summary of the subject matter to be covered. The summary should include a statement of the hypotheses being examined and the conclusions and implications to be drawn from the material.

Invited Papers. Members are urged to suggest names of eminent scholars, researchers, or professional workers who could make a valuable contribution to the program. However, invitations to appear are extended only by the Program Committee.

Symposia, Panels, Forums, and Workshops. Members may suggest proposals for symposia, panels, forums, and workshops. All participants should be identified as indicated in *Identifying Data* section above. Proposals should include a statement of the purpose and significance of the presentation, and a description of the subject matter to be covered. The specific contribution of each participant should be indicated.

Film Theater. Suggestions concerning films appropriate for the Film Theater should be sent directly to the Chairman of the Film Theater Subcommittee, Dr. Robert J. Duffy, 2511 Hazelwood Way, Palo Alto, California.

Scientific Exhibits. Free space for scientific exhibits will be available. Application for Space Forms may be obtained by writing the Executive Secretary, American Speech and Hearing Association, 1001 Connecticut Avenue, N.W., Washington 6, D.C.

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Evaluating Children with Language Delay

• *Tina E. Bangs*

Parents are usually concerned about their children if they are not following oral directions at least by two years of age or if they are not talking by the time they are three. Often the first step is to seek medical advice which subsequently leads to a speech and hearing center referral where the speech pathologists and audiologists attempt a differential diagnosis and make recommendations as to the need for training. If the concensus is to place the child in a speech and/or language[1] habilitation program, the clinician is notified and the youngster is enrolled. The clinician who is expected to evaluate and carry through a training program is usually provided with a case history study, medical records, and a label of one or more of the following: peripheral hearing loss, mental retardation, symbolic language disorder, emotional disturbance, lack of opportunity, or unknown etiology. In most instances this kind of information is not sufficient for adequate lesson planning.

The value of case history taking and medical reports should not be minimized, but the clinician has a need for additional detailed studies which will give her a baseline upon which she can begin her training program. For example, she wants to know the present approximate age level at which the youngster is understanding oral language, using oral language, and articulating. She is interested in social maturity, visual motor perceptual skills, work habits, and any information which will help to delineate the assets and liabilities of each child in order that appropriate lesson plans and motivational material may be prepared.

In an effort to assist the clinician, this article presents a systematic approach to the study of the language-delayed child before speech habilitation. The procedures to be discussed are offered only as a starting point or a pattern for diagnosticians who wish to obtain information which will be valuable to clinicians who are training children with language problems. The assumption that one diagnostic procedure will meet the needs of all speech and hearing clinics is ipse dixit, but the sharing of methods has obvious value. The following discussion will cover evaluative procedures used (a) in the initial interview, (b) in an observation class, (c) in psychometric testing, and (d) in a language and speech training program.

[1]For purposes of this article, oral language is defined as a system of oral symbols used by two or more persons for communication purposes; and speech is defined as the functioning of the breathing, phonating, resonating, and articulating systems to produce the verbal symbols.

Tina E. Bangs (Ph.D., Stanford University, 1958) is Associate Director of the Houston Speech and Hearing Center, Houston, Texas.

Initial Interview

The purpose of the first interview is to record pertinent information available from the parents or other informants and to ascertain what additional reports may be obtained from ancillary sources. Case history taking is a part of this interview and the manner in which it is obtained depends upon the kinds of questions the speech pathologist is accustomed to asking. However, the following areas are customarily investigated: birth history, developmental milestones, medical information, language and/or speech development, psychological factors, educational background, and family history. In addition the speech pathologist will obtain or secure permission from the parent to request any of the following findings which may be related to the case study: phonetic inventory, otological and audiological evaluation, psychological studies, records from schools or clinics previously attended, pediatric findings, neurological study with EEG, and reports of ophthalmological and glandular studies if indicated. Records of drug therapy, if in progress, are also helpful.

Observation Class

Once this information has been collected and analyzed, the examiner may wish to continue the evaluation by referral to an observation class. There are certainly many occasions when this will not be necessary as the first interview will clearly indicate that the language delay is due to bilingualism, hearing loss, or general mental retardation. In such instances, further study in an observation class may be contraindicated. There are some children with delayed language development, however, who are 'different.' Their social behavior is deviant, they do not learn in an orderly fashion, or they have multiple physical anomalies. These youngsters are often an enigma to the speech pathologist as well as the clinician who has been asked to 'teach them to talk.' Conceivably, the clinician could do a better job of lesson planning and training if she had more specific information about these children.

The experienced clinician assigned to conduct the observation class will want to study the interaction of each child with his peer group as well as with adults. For this reason, two or more children, if feasible, should constitute a class. Other kinds of information which will be of value to the clinician are noted and recorded on the observation class record sheet (Appendix 1).

Each child will remain in the observation class until the clinician has completed her evaluation. If a tractable youngster is seen for a one-hour period on consecutive days, he may be studied in three or four sessions, whereas an uncooperative child may require many days of observation before a final report is completed.

Psychometric Testing

Present standardized intelligence tests, by themselves, cannot give a completely valid measurement of the mental age level of children with language delay. Nevertheless, as an adjunct to teacher judgment, psychometric measurement may serve as a valuable tool for determining the educational starting point for these youngsters. Such tests are usually easier to administer when a child has adjusted to his new environment; therefore, it would seem expedient for the psychologist to visit the

observation class where he or she could play with him and perhaps run some of the tests in the classroom environment.

A battery of psychometric tests has been designed to delineate the assets and liabilities of children with speech and/or language problems. It is composed of a few well-known standardized tests as well as subtest items selected from a variety of sources. The four factors explored by the test items are (a) language (ideation, comprehension, and usage), (b) memory-attention (visual and auditory), (c) visual-motor perceptual skills, and (d) social maturity. These areas were chosen because they appeared from past classroom experience to be the modalities of learning which the teacher is called upon to train. The battery, as a whole, has not been standardized on any population; therefore, it should be interpreted very liberally by the psychologist and the clinician. Terms were defined operationally when the battery was constructed so that all persons would be communicating about the same thing.

Language. Children with speech and/or language problems are tested in ideation, comprehension, and usage of language.

Ideation. Inner language or thinking defines ideation. It is the ability to solve problems other than those involving primarily visual-motor-perceptual skills or immediate memory. The test items can be performed without verbal instruction and without an oral response. Tests: Pictorial Associations (7) and Pictorial Analogy (7).

Comprehension. Test items for comprehension of oral language are presented with oral instruction but do not require an oral response. Tests: Ammons Full-Range Picture Vocabulary Test (*1*) and subtests from Binet Form L (BL) (*12*), Binet Form M (BM) (*12*), and Gesell (*5*). The following items are included and the Binet method of scoring is utilized:

Year 2-0 and below

1. (G) Picture Cards—dog, shoe, cup, house, clock, basket, leaf, flag, star. (5 plus)
2. (BL) Identifying Objects by Name—kitty, button, thimble, cup, engine, spoon. (4 plus)
3. (BL) Identifying Parts of the Body—hair, mouth, ear, hand. (3 plus)
4. (BL) Obeying Simple Commands—Give me the kitty. Put the spoon in the cup. Put the thimble on the block. (2 plus)
5. (BM) Identifying Objects by Name—dog, ball, train, bed, doll, scissors. (4 plus)

Year 2-0 to 2-6

1. (G) Picture Cards—dog, shoe, cup, house, clock, basket, leaf, flag, star. (7 plus)
2. (BL) Identifying Parts of the Body—hair, mouth, ear, hands. (4 plus)
3. (BL) Identifying Objects by Use—Show me what we drink out of, goes on our feet, we buy candy with, we cut with, we ride in, we use to iron clothes. (3 plus)
4. (BM) Obeying Simple Commands—Give me the dog. Put the button in the box. Put the scissors beside the block. (2 plus)
5. (BM) Identifying Objects by Name—dog, ball, train, bed, doll, scissors. (5 plus)

Year 2-6 to 3-0

1. (BM) Identifying Objects by Use—Show me the one that we cook on, we sleep in, a man smokes, we sit on, we sweep the dust into, we cut with. (5 plus)
2. (G) Discriminates Prepositions—Put the ball on the box, in the box, in back of the box, in front of the box, under the box, beside the box. (2 plus)

Year 3-0 to 3-6

1. (BL) Obeying Simple Commands—

Give me the kitty. Put the spoon in the cup. Put the thimble on the block. (3 plus)

2. (BL) Identifying Objects by Use—Show me what we drink out of, goes on our feet, we buy candy with, we can cut with, we ride in, we use to iron clothes. (5 plus)
3. (BL) Comparison of Sticks. (3 out of 3, or 5 out of 6)
4. (BM) Comparison of Balls. (3 out of 3, or 5 out of 6)

Year 3-6 to 4-0

1. (BL) Pictorial Identification—Which one do we cook on, carry when it is raining, gives us milk, has the longest ears, shines in the sky at night, catches mice? (3 plus)
2. (BM) Pictorial Identification—Show me which one can fly, swims in the water, do we read, tells us the time, does the hen lay, grows on a tree. (3 plus)

Year 4-0 to 4-6

1. (G) Discriminates Prepositions—Put the ball on the box, in the box, in back of the box, in front of the box, under the box, beside the box. (4 plus)
2. (BL) Pictorial Identification—Which one do we cook on, carry when it is raining, gives us milk, has the longest ears, shines in the sky at night, catches mice? (4 plus)
3. (BL) Aesthetic Comparison. (3 plus)
4. (BL) Pictorial Likenesses and Differences. (3 plus)

Year 4-6 to 5-0

1. (BM) Number Concept of Three—Give me 3 blocks. Give me 3 beads. Give me 2 blocks and 1 bead. (2 plus)
2. (BM) Pictorial Similarities and Differences. (9 plus)

Year 5-0 to 6-0

1. (BL) Pictorial Likenesses and Differences. (5 plus)
2. (BM) Number Concepts—Give me ____ blocks. 3—9—5—7. (3 plus)

Usage. The subtests for language usage involve ideation and oral comprehension, but only oral responses are scored. The items test just a small part of oral communication. (Sentence length and syntax are recorded by the clinician on the observation sheet.) Tests: subtests from Binet Form L (BL) (*12*), Binet Form M (BM) (*12*), and Gesell (G) (*5*). The following items are included and the Binet method of scoring is utilized:

Year 2-0 and below

1. (BL) Word Combinations. (2 or more words)
2. (BM) Naming Objects—shoe, watch, telephone, flag, jack-knife, stove. (3 plus)

Year 2-0 to 2-6

1. (BL) Naming Objects—chair, car, box, key, fork. (4 plus)
2. (BM) Naming Objects—shoe, watch, telephone, flag, knife, stove. (4 plus)
3. (G) Gives Full Name.

Year 2-6 to 3-0

1. (BM) Naming Objects—shoe, telephone, flag, knife, stove. (5 plus)
2. (G) Action-Agent Test. (6 plus)

Year 3-0 to 3-6

1. (G) Action-Agent Test. (7 plus)
2. (BM) Comprehension I—What must you do when you are hungry? Sleepy? (1 plus)
3. (BL) Response to Pictures I. (2 plus)
4. (BL) Comprehension I—What Must you do when you are thirsty? Why do we have stoves? (1 plus)
5. (G) Tells Sex—Are you a little boy or a little girl?

Year 3-6 to 4-0

1. (G) Action-Agent Test. (13 plus)
2. (BL) Comprehension II—Why do we have houses? Why do we have books? (2 plus)
3. (BM) Opposite Analogies I—Brother is a boy; sister is a . . . In daytime it is light; at night it is . . . Father is a man; mother is a . . . The snail is slow; the rabbit is . . . The sun shines during the day; the moon at . . . (2 plus)
4. (BM) Number Concept of Two. (2 plus)

Year 4-0 to 4-6

1. (G) Action-Agent Test. (14 plus)

2. (BL) Opposite Analogies I—Brother is a boy; sister is a . . . A table is made of wood; a window of . . . The point of a cane is blunt; the point of a knife is . . . An inch is short; a mile is . . . (2 plus)
3. (BM) Definitions—What is a key? What is a dress? What is a bed? (2 plus)
4. (BM) Materials—What is a house made of? What is a window made of? What is a book made of? (2 plus)
5. (BM) Comprehension II—What do we do with our eyes? What do we do with our ears? (1 plus)
6. (BL) Materials—What is a chair made of? What is a dress made of? What is a shoe made of? (2 plus)

Year 4-6 to 5-0

1. (G) Action-Agent Test. (15 plus)
2. (BL) Definitions—What is a ball? What is a hat? What is a stove? (2 plus)
3. (BM) Comprehension II—What do we do with our eyes? What do we do with our ears? (2 plus)
4. (BL) Counting Four Objects. (2 plus)
5. (G) Knows Colors—red, yellow, blue, green. (4 plus)
6. (G) Names Coins—penny, nickel, dime, quarter. (3 plus)

Year 5-0 to 6-0

1. (BM) Opposite Analogies. (4 plus)
2. (BM) Differences—What is the difference between a bird and a dog? A slipper and a boot? Wood and glass? (2 plus)
3. (BM) Response to Pictures I. (Level II, 2 plus)
4. (BM) Counting 13 Pennies. (1 plus)
5. (G) Distinguishing Morning and Afternoon—And when does afernoon start?
6. (BL) Vocabulary. (5 plus)

Memory-Attention. These tests attempt to measure a child's ability to attend to visual or auditory stimuli and then recall the symbols from memory: (a) tests of visual memory—Visual Attention Span (7) and Knox Cubes (*2*); (b) tests of auditory memory—Digit Span, Binet Form L (*12*) procedure through four digits forward and WISC (*13*) used from age 5-2.

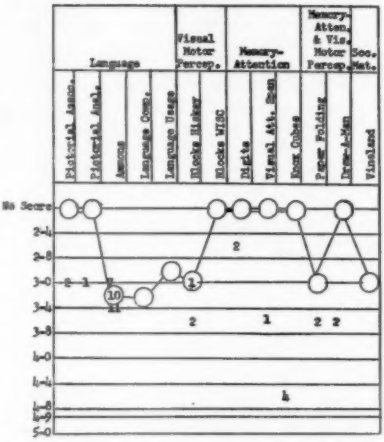

FIGURE 1. Representation of assets and liabilities of a child referred to a speech center. K. D.: Referred at age 4-1 years because of language delay. He scored 3-3 years on language comprehension, but all other responses were below 3-0 years. Hearing was normal. EEG in second year of life was normal. Neurologist reported, '. . . Cranial nerves as tested were within normal limits. He used all extremities without difficulty, but did seem a little clumsy for his age. At this time it was my feeling that the total picture was suggestive of a brain-damaged child.' In a language development class he was found to be extremely hyperactive. He made slow gains and in a nine-month period was communicating orally. The scores shown (obtained at 4-9 years) cluster at or below the 3-0 level. Staffing of the child by all persons concerned led to a diagnosis of language delay resulting from general intellectual deficit. However, his oral language development was considered to be commensurate with general mental abilities. Learning potential is to be determined after further training with a group of slow learning youngsters.

Visual-Motor-Perception. Tests of visual-motor-perception attempt to measure a child's ability to observe a specific design or pattern and then reproduce it. Tests: Block Patterns (7) and Block Design (*13*).

Memory-Attention and Visual-Motor-

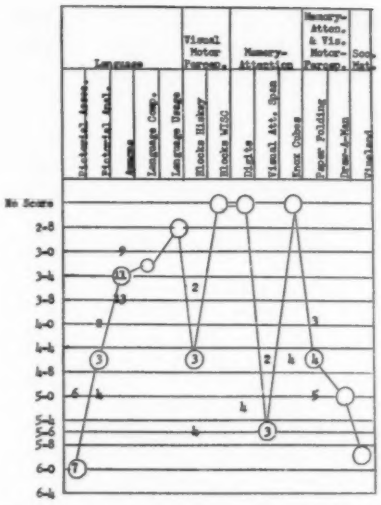

FIGURE 2. Representation of assets and liabilities of a child referred to a speech and hearing clinic. T. L.: Referred at age 5-2 years because of language delay. EEG technical summary: 'Occipital dominant moderately high voltage 6-7 per second activity mixed with many 3½-5 per second waves. Hyperventilation; unable to obtain patient cooperation. Sleep; paroxysmal parietal dominant 3-4 per second serials in drowsiness. No abnormal forms. No focal signs. Impression: Generalized slow dysrhythmia.' Boy was placed in an observation class where the clinician found him to be highly distractable, hyperactive, and inconsistent in responses to tasks given to him. Psychometric and audiometric study were impossible due to poor cooperation. Subsequently he was placed in a language development program with primary emphasis on socialization. The scores shown were obtained at age 5-6. Audiometric study revealed a perceptive type involvement in both ears with a pure tone loss in the better ear as follows: 500 cps—25 db, 1K—35 db, and 2K—60 db. Staffing of the child by all persons concerned led to a diagnosis of language delay resulting from hearing loss and probably complicated by brain dysfunction.

Perception. The following tests appear to include both modalities of learning, memory and visual-motor-perception: Paper folding (7) and Draw-a-Man (*6*).

Social Maturity. All phases of social development as described by Doll (*4*) are scored. Test: Vineland Social Maturity Scale (*4*). Answers to the questions are given by the parent and scored by the clinician.

TEST INTERPRETATION

A profile of each child's performance is recorded on a graph (Figures 1 and 2) which lists the test items across the abscissa and chronological age in four-month intervals along the ordinate. Raw scores from each test are appropriately placed, raising the ever present problem of attempting to assign age levels when the raw scores have an unequal unit scale. Each psychologist will use the method of recording which best fits his needs. The examples (Figures 1 and 2) plot the scores which each subject obtained on the test battery. Liberal interpretation must be made, of course, for the child may be closer to the next higher raw score than the one he actually obtained. In addition, all of the test items have not been standardized on the same age groups. For example, Binet items go as low as 2-0 years, whereas the Hiskey items have a base of 3-0 and 3-6 years. The entire battery is always given, however, and a 'no score' response is recorded in the appropriate space. A horizontal bar indicates the chronological age of the child and lines are drawn to connect the raw scores. The resulting profile assists the psychologist to answer two questions: (a) Is the child's language development commensurate with his other modalities of learning (Figure 1)? (b) What are the assets and liabilities of the child as measured by the battery (Figure 2)?

As soon as the observation class clinician and psychologist complete their

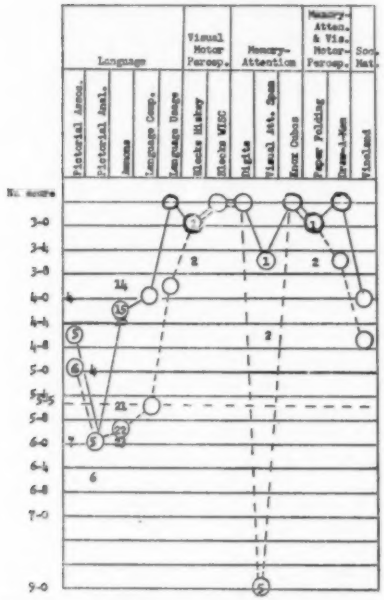

FIGURE 3. Representation of assets and liabilities of a language-delayed child before and after a nine-month training period. R. R.: Referred at 3-8 years because of language delay. EEG run at age 3-0: 'Paroxysmal, generalized slow dysrhythmia. These are abnormal findings of epileptiform character consistent with a diagnosis of epilepsy but nonspecific as to type.' EEG run at age 3-9: 'Paroxysmal generalized slow dysrhythmia. Findings essentially unchanged since original study.' This girl was enrolled in an observation class where she was referred to a beginning language development program. Periodic psychometric study has been accomplished and the scores demonstrate areas of gain after nine months of training.

study, a client staffing is held. Attendance at this meeting should include, if possible, all persons who are concerned with the youngster's learning and medically related problems, e.g., physician, speech and hearing pathologists, observation class clinician, psychologist, clinicians who may teach the child, and all others who may make important contributions. As a result of the staffing, the physician may wish to start or to change medication, or he may request additional medical evaluations. The audiometrist may recommend an auditory training program designed to condition

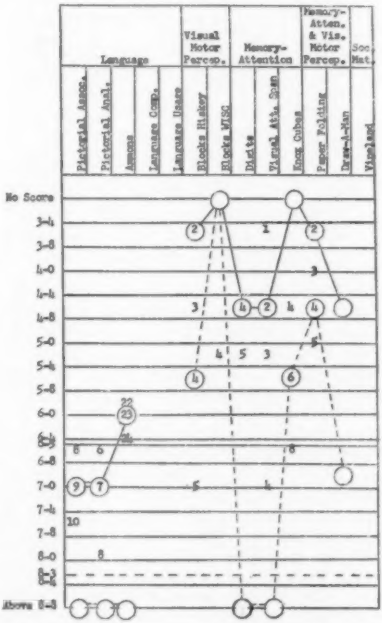

FIGURE 4. Representation of gains made by a boy who was categorized as a potential reading problem. M. S.: Boy referred at age 6-0 because he was doing poorly in kindergarten. Parents suspected he might be a retarded reader as was an older brother. Gross neurological study was normal. EEG was not run. Hearing was normal. He had a mild articulatory disorder and secondary stuttering symptoms. Not all of the items on the battery were available at the time he was tested. Results of retesting demonstrated an average or above average gain in all tasks except those considered to be visual-motor-perceptual skills. At age 8-3, this boy was still unable to read, in spite of an intensive training program.

the child for hearing testing which was previously impossible, and the speech clinicians may wish to discuss the kind of class and training program that will fit each child's needs. In other words, recommendations for the future training and medical attention should come from the entire group, because children with disorders of language symbolization usually demonstrate physical problems and language behavior which are too complex to be evaluated by one person.

Training Program

The child's progress in any language building program is of great concern to both clinician and parents. The fact that the child is using more words or putting two words together is usually self-evident. Unfortunately, increase in oral vocabulary does not always preclude improvement in other learning areas (Figure 3). For this reason, a periodic evaluation of each child's progress is recommended in order that (a) the clinician may assess her teaching techniques and (b) she may have specific information for parent conferences.

Two methods are used for studying the progress of children with language and/or speech problems: (a) clinician judgments and (b) psychometric retest (Figures 3 and 4). If at all possible, both kinds of evaluations should be made within the same week. The interval of time between re-evaluations will depend upon the child's need. A six-month period may be advisable for some youngsters; annual checks may be sufficient for others.

Clinician Evaluation Record. Report cards are usually thought of as a device for telling parents how well their children are doing in school. Such reporting also informs the clinician, for she must take time out periodically to study the assets and liabilities of each child in her program. The evaluation sheet (Appendix 2) is, in essence, a detailed report card which tells something about a child's language development, social maturity, motor skills, work habits, and problem solving abilities. All items were suggested by clinicians, and operational definitions and examples of each were formulated. Norms on the behavior of children at various age levels were accumulated from a variety of sources such as Bayley (*3*), Doll (*4*), Gesell (*5*), McCarthy (*8*, pp. 492-630), Meredith (*9*), Metraux (*10*), and Templin (*11*). This information serves as a valuable reference for clinicians and speech pathologists.

Psychometric Retest. The clinician evaluation record plus the psychometric battery as a retest device will offer valuable comparative data for study of each child's progress. The disadvantages of using the same items for retest as well as administering two separate batteries are obvious. However, the paucity of standardized tests that are available or suitable for preschool children with language disorders made it necessary to utilize the same battery for retest purposes. It must be remembered that the battery presented in this article is suggested only as a starting point for those who have not used such a device or as a pattern for building more tests of its kind for evaluative purposes. Figures 2 and 3 demonstrate the type of profile obtained with retest information.

Summary

Speech clinicians are often asked to

work with language-delayed children when the only diagnostic picture is a case history and a label of one or more of the following: mental retardation, symbolic language disorder, emotional disturbance, hearing loss, lack of opportunity, and unknown etiology. The clinician spends much valuable class time trying to evaluate the child in terms of his specific assets and liabilities so that she may make appropriate lesson plans and motivational material.

In order to alleviate this problem a systematic, diagnostic approach is presented which is clinician-oriented: (a) The speech pathologist obtains a case history and any pertinent information from ancillary sources, such as audiology, medicine, and previous educational records. (b) The child is enrolled in an observation program where clinician judgment and psychometric evaluations are added to the information already obtained. The child is staffed and placed in an appropriate educational environment. (c) During the time he is enrolled in class the diagnostic procedure is continued by means of a detailed report card and psychometric retest. This cumulative data is utilized in the formulation and evaluation of training procedures.

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Appendix 1

OBSERVATION CLASS RECORD

Name:_____ Dates observed:_____
Birth Date:_____ Submitted by:_____

Language

Receptive:
Points to named objects: grossly different____ slightly different _____
Points to named pictures:grossly different____ slightly different _____
Recognition of verbs: oral _____ pictures _____
Recognition of animals: objects _____ pictures _____
Recognition of animal cries _____
Follows 1, 2, 3, oral serial directions _____
Follows gesture directions _____
Remarks _____

Expressive:
Spontaneous verbalization is projective _____
Names objects _____ pictures _____animals _____
Gives animal cry _____
Vocabulary: nouns _____ verbs _____ adj. _____
prep. _____ conj. _____ articles _____
Approx. length of sentence _____ syntax _____
Perseveration _____
Misnames, not perseveration _____
Echolalia _____ imitatability _____
Describes a picture _____
Relates an event _____
Rote counting _____ number concepts _____
Voice: quality _____ pitch _____
duration_____ loudness _____
Stuttering _____
Gesture language _____
Written language: draws a picture _____ copies name _____
Remarks _____

Ideation: (Requires no oral directions nor oral responses)
Matching: obj. to obj. _____ pict. to pict. _____
pict. to obj. _____ colors _____ forms _____
Sorting: dolls from furniture _____ forms _____
colors _____ animals from people _____
clothing from not clothing _____ boy's from girl's clothes _____
clothing for family members _____ edible from non edible _____
things inside and outside house _____
Puzzles _____
Recognizes change in size _____
Plays with toys appropriately _____
Tells story with felt pieces on flannel board _____
Copies: rhythm _____ peg board design _____
bead pattern _____
General insight into problems _____
Remarks _____

Work Habits
Learning rate when taught a skill _____
Awareness of errors _____
Ability to shift _____
Scanning and study habits _____
Will sit at table _____
Attention span _____
Remarks _____

Social Behavior
Vineland: age equiv. _____ soc. quot. _____
Relates to: adults ___ children ___ parents ___ environ. _____
Sense of humor _____
Social perception _____
Free play observation _____
Reaction to frustrating experience _____
Remarks _____

Physical
Sideness: hand _____ foot _____ eye _____
Gross coordination: walking _____ sitting _____ other _____
Eye hand coordination: pegs _____ beads _____ puzzles _____
Oral mechanism: structure _____
Muscular mobility: lips ___ tongue ___ jaw ___ drooling _____
Hearing: projective _____ consistent _____
Medical: neurological _____ EEG _____ pediatric _____
other _____ medication _____
Breathing _____
Remarks _____

Comments on family _____

Summary _____

Disposition _____

APPENDIX 2

CLINICIAN EVALUATION RECORD

Name_____

Birth Date_____

Original Enrollment Date_____

Key:
A Yes, or very good
B Better than average
C Average
D Below average
E No, or poor
✓ Inconsistent
O No opportunity to observe

PROBLEM SOLVING

	Clinician's initials								
	C.A.								
	Date								
Matches color									
Matches objects									
Matches pictures									
Matches objects to pictures									
Matches form									
Does easy puzzles									
Does difficult puzzles									
Sorting									
Finds things that go together									
Shows initiative									
Shows insight into problems									
Learning rate									

COMMENTS: (Star items above. Write date and comment in this space.)

SOCIAL	Clinician's initials						
	C.A.						
	Date						
Plays mostly by self (A or E)							
Peer play, parallel (A or E)							
Peer play, cooperative (A or E)							
Teacher-child relationship							
Adult-child relationship							
Eye contact most of time (A or E)							
Personal hygiene							
Contributing member of group							
Soc. acceptable behavior at school							
Avoids catastrophic reactions							
Demonstrates compulsive behavior							
Shows feeling, pity, etc. (A or E)							
Shares toys or turns							
Plays group games							
Dependable							
Social perception							
Parent cooperation, mother							
Parent cooperation, father							

COMMENTS: (Star items above. Write date and comment in this space.)

MOTOR	Clinician's initials						
	C.A.						
	Date						
Handedness (L R M)							
Cuts with scissors 1" or more							
Outlines with scissors							
Detail with scissors							
Coloring (scribbles within design)							
Coloring (detailed)							
Draws undifferentiated form and names (A or E)							
Draws differentiated form and names (A or E)							
Toilet trained-soiling (A or E)							
Toilet trained-wetting (A or E)							
Gait							
Rhythm							
Gross motor activity							
Rocking (A or E)							
Past pointing (A or E)							
Writing within framework							
Reversals in writing							
Knows left to right-pictures							
Knows left to right-writing							

COMMENTS: (Star items above. Write date and comment in this space.)

WORK HABITS

	Clinician's initials							
	C.A.							
	Date							
Attention span								
Distractable								
Awareness of error								
Corrects own errors								
Hyperactive								
Ability to shift								
Completes assignment on time								
Completes assignments, but not on time								
Withness								
Meticulosity								
Neatness of work								

COMMENTS: (Star items above. Write date and comment in this space.)

LANGUAGE

	Clinician's initials							
	C.A.							
	Date							
Language comprehension								
Follows group instruction								
Follows individual instruction								
Babbles much of time								
Lallation much of time								
Echolalia much of time								
Combines syllables								
Uses plurals								
Repeats sentence of 12-13 syllables								
Knows right and left								
Language perseveration								
Growth of spoken language								
Verbalizes projectively								
Inappropriate sounds or words (no stimulus)								
Has 1 single word								
Has 10 words								
Combines 2 words								
Combines more than two words								
Asks for objects voluntarily								
Uses pronouns but inappropriately								
Uses pronouns correctly								
Relates a story								
Omits consonants								
Gives full name								
Misnames								
Apraxic-like (A or E)								
Voice, pitch								
Voice, loudness								
Rhythm of speech								
Quality of voice								
Number concepts to 2								
Number concepts to 5								
Number concepts to 10								

Children with Vocal Nodules

• *D. Kenneth Wilson*

The speech clinician may see only an occasional child with vocal nodules since this condition is relatively infrequent in children. However, as Birrell (*4*) has pointed out, it is quite surprising that more children do not have some type of chronic change in the larynx because of vocal abuse. All one has to do, he says, is to listen to children on a playground or try to take a nap on a crowded beach to realize the enormous strain children place on their vocal apparatus.

One of the first questions that arises following a diagnosis of vocal nodules is: Why has this child developed this condition? West, Ansberry, and Carr (*25*, p. 76) maintain that if the voice is properly used no amount of vigorous vocalization can damage the edges of the vocal cords. Wells (*22*) states that friction and impact seem to cause the nodules. Greene (*10*, p. 78) asserts that the nodules are a direct outcome of vocal abuse and forcing the voice, and can be regarded as an advanced stage in vocal strain; in fact, Berry and Eisenson (*3*, p. 212) estimate that vocal abuse probably accounts for the development of the granuloma in 90 per cent of the cases. Vocal abuse may be defined as the improper use of the voice as a result of too high pitch, excessive air pressure against the under surfaces of the bands (*25*, p. 76), excessive talking, and prolonged vigorous use of the voice such as screaming, shouting (*14*, pp. 669-672), abrupt initiation of tone, and production of strained sounds in play activity. Another aspect that must be investigated, according to Pronovost (*16*, p. 151) and Boland (*5*), is the emotional area.

Vocal nodules resulting from misuse of the voice usually appear in the region of the cords most active in the production of the higher notes, that is, approximately at the junction of the anterior and middle thirds of the cords. The nodes occur where the mechanical strain is the greatest and are generally bilateral, occurring exactly opposite each other, although occasionally they are unilateral (*6*, p. 159).

Opinions on the initial composition of the cells vary. Voorhees (*21*) describes the beginnings of a vocal nodule, 'At first, a tiny mucous gland on the margin of the cord becomes closed and we have what amounts to a retention cyst.' He adds that later on with continued misuse the area becomes 'organized' and a fibrous nodule results. Greene (*10*, p. 78) states that in the early stages the nodules may consist of thickening of the stratified squamous epithelium of the cord sometimes accompanied by slight swelling and edema. Most authorities agree that fully

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developed nodules are fibrous growths consisting of layers of epithelium that are benign and belong to the polyp family (*1*, p. 147, *4*, *10*, p. 78, *20*, p. 185, *22*). Usually the nodes are pyramidal in shape and vary in size from that of a small seed to a peppercorn (*10*, p. 78). Both size and composition of the vocal nodules play an important part in the degree of hoarseness present (*20*, p. 186, *24*). Though a large mass generally produces more breathiness, a vocal nodule that is hard and not compressible can cause a faulty voice even though it is quite small (*14*, p. 662).

When vocal nodules are present a child may have a voice that sounds as if he has a cold or laryngitis (*16*, p. 151). Moore (*14*, p. 662) feels that growths on the glottal edges of the vocal cords provide a mechanical interference which may cause a breathy voice. Vocal growths prevent good closure of the cords making for inadequate infraglottal pressure (*13*, *14*, p. 662, *20*, p. 186). The escaping air creates a turbulence which is the source of the defective sound. Then, too, Moore says, the nodule can become a secondary source itself if it is loose on a cord and jiggles during vibration of the cords. Nodules may cause an undesirable voice by weighting or stiffening the cords unduly, and excess mucous usually accompanies a growth and increases the hoarseness (*14*, pp. 664-666). Van Riper and Irwin (*20*, p. 186) and Harrington (*11*, p. 197) say that a lowering of the voice pitch is often a beginning symptom that accompanies the increasing huskiness and hoarseness.

Medical Examination

General Physical Condition. Of major importance in children with vocal nodules is the general physical condition. A report from the pediatrician or family physician is desirable before administering diagnostic speech and hearing tests or treatment. The physician's report of the present physical condition provides important diagnostic information. His observations on the child's behavior, intelligence, and relationship with his parents may also be helpful.

Larynx. A referral to a laryngologist is essential in cases of hoarse voice (*8*, p. 180, *23*, p. 43). Much harm can be done by giving speech exercises to persons who have active pathology of the larynx (*19*, p. 323). It is agreed (*2*, *15*, *16*, p. 151) that an individual should not remain hoarse for long without a laryngeal examination. Hoarseness lasting continuously for 10 days to three weeks should receive the attention of a laryngologist. Of primary importance to the speech clinician is a complete report of the laryngeal examination. Such a report will describe the location of the nodules, their size, and their composition. Additional valuable information may be found in the laryngologist's observation of the child, of parent-child relationships, and of the presence of disease or structural deviations in the oral, nasal, and laryngeal areas. All these details from the laryngeal examination plus the laryngologist's opinion that voice work is not contraindicated are to be obtained before the speech clinician can proceed.

Speech and Hearing Examination

Speech and hearing diagnostic procedures begin with a detailed case history obtained through interviews with

the parents. In some situations it may be profitable to have the parents seen initially in a group interview (*27*). During the group meeting a description of the child's problem can be obtained and the parents informed about test procedures. Later the parents should be seen for an individual interview. This interview should include details of the child's problem and the environment (*26*), an account of his growth and development, assessment of adult-child relationships, and pictures of the intellectual capacity and the emotional aspects of the child. Moore (*14*, pp. 682-685) suggests that the history should include a description of the onset of the problem, history of vocal abuse, accidents, operations, allergies, glandular balance, and diseases, especially of the upper respiratory tract. The parents' opinion about the possible cause of the vocal nodules may reveal important diagnostic information. Also, it is extremely important to determine if the hoarseness varies in severity and, if so, under what conditions.

After appropriate parent interviews the child should be seen for observation and testing. Routine peripheral speech mechanism examination, audiometric testing, and an articulation test should be administered. The voice should be carefully studied in its major aspects of pitch, loudness, and quality. A tape recording can be made of this examination for later use during remedial training. The habitual pitch level, pitch range, and flexibility must be carefully noted. The loudness of the voice should be evaluated in respect to its appropriateness to the situation and the child's control over it. During the assessment of pitch and loudness, the quality of the voice is evaluated in terms of its relationship to these two aspects. The hoarseness is noted in connected speech and in isolated vowels. It is important to determine the degree of hoarseness present in the different vowels. Sometimes it is desirable to know if the child being examined follows the patterns observed in adults by Sherman and Linke (*18*) and Rees (*17*). For example, both of these reports indicate a general trend for the vowels [æ], [ɑ] and [ɔ] to show more harshness than [i], [u], [ɪ] and [ʊ].

Lastly, a rating of the severity of the hoarseness is made on a three-point scale: mild, moderate, or severe. It is suggested that most children with vocal nodules should be given intellectual and personality evaluations.

Prognosis is of major concern in a child with vocal nodules. Negus (*15*) says, 'A node is easily seen but not so easily cured.' Greene (*10*, p. 79) says that in every case the fundamental cause of the condition must be removed or the nodes will recur and that a course in vocal re-education is essential for a permanent cure to be effected. Van Riper and Irwin (*20*, p. 189) state that the main aspects of prognosis are the location and size of the nodules, their duration, the necessity for surgery, and the case's ability to change his habits of phonation.

Small nodules seem to respond to voice rest or voice training (*24*). Greene (*10*, p. 79) feels that larger nodules require surgery before voice re-education, but other writers, Harris (*12*) for example, feel that cords are often permanently damaged as a result of deep removal. Brodnitz and Froeschels (7) feel that the longer the nodules have been present the more difficult the re-education will be.

Many authorities recommend voice rest prior to the consideration of other therapy or treatment. Others suggest that training should be started immediately without voice rest. Eisenson and Ogilvie (*9*, p. 97) suggest that a combination of voice rest and training is necessary. Regardless of the desirability of voice rest, it is usually impossible to consider for children. Therefore, as West, Ansberry, and Carr (*25*, p. 77) suggest, relief must be given for the rubbing edges of the vocal folds by moving the point of greatest friction to some other portion of the glottic edge, usually by lowering the pitch of the voice. The suggested procedure with children follows the plan suggested by Berry and Eisenson (*3*, p. 213), that is, to have vocal re-education as the first step with surgery being done only where it is evident that reduction of the nodules cannot be effected by vocal re-training.

Re-education

The treatment of children with vocal nodules resulting from improper use of the voice includes the following goals: (a) the elimination of vocal abuse; (b) training in pitch, loudness, and quality; and (c) making the new speech characteristics habitual.

Elimination of Vocal Abuse. Of primary importance is the elimination of vocal abuse in any form. The child must be made aware of his undesirable habits and substitute activities must be suggested for each one. He must first be informed that many of his vocal abuses are harmful to him even though other children may not suffer disastrous results from such practices. In most instances it is advisable to help the child understand his own problem by giving him the basic facts about his condition and explaining the rationale for eliminating vocal abuse.

A picture notebook is very useful. A picture representing one type of vocal abuse can be put into the notebook and labeled. On the same page another picture is placed which shows appropriate vocal behavior for this situation. For example, a picture of a boy yelling 'hello' to a friend from across the street can illustrate an undesirable practice, and a picture of a boy waving 'hello' to his friend across the street the desired way.

The more flagrant types of vocal abuse, such as yelling and screaming, are relatively easy to bring to the child's consciousness in this way, but other types of abuse are more difficult to bring to his attention. Some of these abuses are found during quiet activities like card games, drawing, and painting. The child may talk in a guttural voice with abrupt tone initiation while playing cards. Also, when playing with cars, airplanes, and other toys, he may imitate the sound of the car or jet plane by producing a hoarse or strained sound.

The clinician can sometimes bring these types of vocal abuse to the child's consciousness merely by identifying them and pointing them out as they occur. Other times a tape recording can be effectively used to identify the undesirable vocal behavior. Less harmful sounds for use during play activity can be given, such as substituting a whistle made with the lips or tongue for the strained vocal imitation of a jet plane or truck. Pictures of these vocal abuses and the substitute behavior can also be put into the notebook.

Pitch Training. Ear training for pitch in a young child with vocal nodules needs to be done on three gross levels only: high, middle, and low. These three pitch levels are based upon his pitch range and habitual pitch level. The high level is near the top of the child's range and coincides with his too-high habitual level. The middle pitch is carefully selected as the level to be established as the new habitual level, and is usually four or five semitones above the basal pitch. The third level is a low level only slightly above his basal pitch. The child is told the significance of each level: that the high level is the 'old way' to be avoided, the middle is the desired 'new way,' and the low pitch is too low to use most of the time.

A basic technique for pitch training is called the 'space game.' The clinician places three pictures of airplanes in the child's notebook, one at the top of the page, one in the middle, and one at the bottom. These are named 'high airplane,' 'middle airplane,' and 'low airplane,' and the three pitch levels are repeatedly demonstrated and associated with each picture. When the child has begun to categorize pitch into the high, middle, and low levels, the clinician may make up stories about the three pictures and keep changing pitch levels. Each time the level changes the child points to the appropriate picture. This technique can be used to build a notebook of similar pictures, such as birds, rockets, or missiles.

When the child has developed good pitch discrimination, the roles of the child and clinician can be reversed with the child becoming the performer and the clinician the listener and judge. The child knows from his ear training the significance and meaning of the three levels of pitch and can therefore strive to habituate the desired pitch.

Loudness Training. Most children with vocal nodules habitually talk too loudly and it is important that loud talking be eliminated. The pattern for loudness training and performance is similar to that used for pitch and it is sometimes desirable to combine pitch with loudness training. Three loudness levels are selected: (a) high speech intensity approximating the undesirable level the child uses, (b) level or range of loudness calculated to be most desirable for the child to use under most circumstances, and (c) low speech intensity.

A basic technique for loudness training is called the 'animal game.' The clinician selects three pictures of an animal, large, medium, and small, to represent a loud voice, a just-right voice, and a soft voice. As with pitch training the child is asked to point to the correct picture as the clinician uses various intensity levels. After loudness ear training has resulted in good discrimination, the child is ready to demonstrate his own ability at controlling speech intensity.

Quality Training. The child must be taught improved methods of phonation to obtain better quality. This improvement is based on training for discrimination of quality. A principal technique for developing quality discrimination is called the 'bad-good game.' The top half of a page of the child's notebook is designated the 'bad' part and the bottom half the 'good' part. Related pictures are pasted on the 'bad' and 'good' halves. For example, a picture of an outlaw on the bad half is described in

a voice that is an imitation of the child's quality, and a picture of a marshal on the good half is described in a voice free of hoarseness. The child is asked to point to the picture indicated by the quality being used by the clinician. All types of stories can be centered about the 'bad and good' technique. Production of improved quality by the child can be based on imitation of the clinician and as a result of strong clinical command. Using words containing vowels previously analyzed as showing least hoarseness for the 'good' way will provide initial success.

Habituating New Patterns. The task of obtaining carry-over in a young child with vocal nodules is especially difficult. A clinician is not only attempting to change the pitch, loudness, and quality aspects of speech behavior but also is attempting to get the child to change his habits regarding vocal abuse. All these aspects add up to a multidimensional carry-over project that requires much patience in child, parent, and clinician.

When the child has demonstrated his ability to handle his voice in the clinic, he can be requested to follow directions for the use of a good voice outside the clinic. Prearranged situations between the child and his parents should be constructed to exercise control over the new patterns.

The rehabilitation schedule may be planned to serve as a reminder for carry-over in the later stages of treatment. In most instances, children with vocal nodules should be seen two or three times a week for an initial period of three months. The nodules should show a reduction in size at the end of this period (*25*, p. 79). The child should be re-evaluated by the laryngologist, and if the report is favorable, the child can continue voice work. Then, as he begins to use the new speech or voice characteristics, the number of sessions is gradually reduced until the child is seen for a checkup once every three months. In some cases of children with vocal nodules it is desirable to follow them for quarterly checkups for several years. Periodic visits to the clinic serve as reminders to both the parent and child and tend to perpetuate the use of the 'new voice.'

Case Presentation

An example of the application of the suggested plan of diagnosis and treatment is the case of Billy.

> Billy was five-and-a-half years old when his parents first noticed occasional hoarseness. During the next six months the periods of hoarseness became more and more frequent until the child continuously talked with a hoarse voice. Billy's pediatrician referred him to a laryngologist. The laryngeal examination revealed bilateral nodules about the size of a pinhead at the junction of the anterior and middle thirds of the vocal cords. A referral was made by the laryngologist to the speech clinic. During the initial interview the parents stated that Billy was an active boy liking sports and outdoor activities where much yelling, loud talking, and other forms of vocal abuse were noticed.
>
> Voice analysis revealed that the child's conversational voice was hoarse in a mild to moderate degree. Under some conditions the voice sounded high in pitch and at times the voice was dysphonic and even aphonic especially at the ends of breath groups. Isolated vowels were analyzed for hoarseness. A psychological evaluation showed the child to be above average in intelligence with no evidence of emotional problems. Treatment was started with Billy on the basis of two sessions a week. The parents were counseled periodically about helping the child at home with carry-over activities. After three months a laryngeal examination revealed

a significant reduction in the size of the nodules; the laryngologist felt the reduction in size was greater than that to be expected under normal procedures without voice work. Treatment was continued for another three months when again the laryngologist reported a continuing reduction in the size of the nodules. During the next six months, the sessions were gradually reduced in number from twice a week to once a month. A recheck by the laryngologist one year after treatment was started revealed that the nodules had completely disappeared. The mother reported that the child no longer had any undesirable vocal habits, that his voice was free of hoarseness, and that the pitch seemed generally lower. Periodic rechecks in the speech clinic during the following year indicated that the child's voice was lower in pitch and completely free of hoarseness.

Summary

Children with vocal nodules require special considerations in diagnosis and treatment. A laryngeal examination is essential and medical clearance is necessary before attempting voice training. A complete physical examination, intelligence testing, and personality evaluation are desirable for a complete diagnosis. Speech and hearing diagnosis includes detailed interviews with the parents and a complete voice analysis.

Voice rehabilitation includes the reduction of vocal abuse, lowering the habitual pitch level, reducing the habitual speech intensity, and improving the hoarse voice quality. The cooperation of parents and others interested in helping the child is important. A significant reduction in the size of the nodules and an accompanying improvement in the voice quality can be expected within three to six months. A systematic follow-up program over a period of several years is sometimes desirable in order to keep a check on vocal abuse and to assure continuation of good vocal habits.

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Effects of Speech Therapy and Speech Improvement Upon Articulation and Reading

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A vast amount of professional opinion and some experimental evidence can be found in the literature concerning possible relationships between articulation problems of school children and reading achievement. The concensus of experts is that some relationships probably exist. The little experimental evidence is inconclusive, being both negative and positive in findings. For a comprehensive survey of the opinion and a summary of experimental evidence concerning these relationships prior to 1951 the reader is referred to Jones (*5*). Since 1951 few additional experimental studies of these relationships have been reported. Using 61 pairs of matched third-grade children, Jones (*5*) found that the experimental subjects who received speech improvement lessons improved significantly in silent reading achievement compared with their matched counterparts who remained in their regular classroom and did not receive this treatment. On the other hand, Wilson (*13*) reported that speech improvement at the kindergarten level resulted in a significant reduction in articulation errors but was not effective in raising reading readiness scores.

Although there has been recent experimental research exploring possible relationships between errors of articulation and errors of spelling (*4, 14*), no additional experimental evidence has been reported showing the effects of speech corrective procedures on reading achievement of school children. Furthermore, no experimental research

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TABLE 1. Treatment populations, experimental groups, and variables under investigation.

Populations	*Number in Treatment*	*Number of Controls*	*Independent Variables*	*Dependent Variables*
Speech Defective Group	532	270		Articulation Reading factor scores Reading comprehension scores
Speech improvement *or* speech therapy	507	245		
Speech improvement, 9 months	402		Speech improvement	
Speech therapy, 9 months	69		Speech therapy	
Speech therapy, 3 months	36		Speech therapy	
Speech improvement *and* speech therapy, 9 months	25	25	Speech improvement and speech therapy	
Normal Group	570	190	Speech improvement	Reading factor scores Reading comprehension scores
Total for All Groups	1102	460		

appears to exist which explores the effects of various types of school correction methods upon improvement in articulation and reading performance of school children. In view of the lack of research and the increasing popularity of speech improvement programs in public schools, a study appeared warranted which would supply answers to the following questions: (a) What are the comparative effects of speech therapy and speech improvement upon the articulation and reading skills of speech defective children? (b) What are the effects of a speech improvement program upon the reading of children with normal articulation?

PROCEDURE

Sample. In September 1958, a county-wide speech improvement program was inaugurated by the speech staff of the Armstrong County Schools, Pennsylvania. From the total of 54 first-grade classrooms, 10 were randomly sampled to serve as experimental groups to receive corrective speech rather than speech improvement, 12 were sampled to serve as control groups and receive neither speech improvement nor correction, and 32 first-grade classrooms received speech improvement. Of the total number of 1650 children enrolled in the 54 first-grade classrooms, 1562

were subjects in this study.

Table 1 shows the treatment populations and indicates the experimental groups involved in this study. One population consisted of 802 of the total of 1562 subjects. These were children found defective on one or more of the 10 consonant sounds used in the study. This population will be referred to as the Speech Defective Group. The second treatment population of 760 children were found to be normal in articulation. This population will be referred to as the Normal Group. The effects of the type of speech treatment upon articulation and reading were investigated in the Speech Defective Group, whereas the effect of speech improvement upon reading was the only variable under investigation with the Normal Group.

Speech Defective Group. In the 10 classes sampled to receive speech therapy a total of 105 subjects were found to have one or more misarticulations and qualified for speech therapy. From the group of 105 subjects sampled to receive speech therapy 69 were randomly sampled to receive this treatment once weekly for nine months and the remaining 36 subjects received speech therapy once weekly for three months. In the 12 control group classes who received no speech correction treatment a total of 245 children had articulation errors and served as control subjects. In the 32 classes sampled to receive speech improvement, 402 children had articulation errors and served as experimental subjects. In addition to the experimental groups described above, two other experimental groups were organized. An attempt was made to investigate the effects of the type of speech treatment upon articulation and reading of first-grade children with more severe articulation problems. Two groups of subjects who were found to misarticulate six or more of the 10 consonant sounds used in the study were equated by matching subjects on three variables and then randomly assigning them to experimental groups. Subjects were matched on the number of mis-

TABLE 2. Equivalency of two groups of first-grade children having higher mean number of misarticulations.

Group	*Mean Number* of Misarticulations*	*SD*	*Buck and Carter Test Prognostic Mean Difference Scores*	*SD*	*Mean IQ*	*SD*
Speech improvement and speech therapy	8.12	1.97	12.3	5.7	98.3	10.34
Speech improvement only	7.97	1.81	12.9	4.9	100.1	11.07

*A maximum score of 10 sounds could be misarticulated by each subject.

articulations, Carter and Buck Prognostic Speech Score (*2*), and IQ, Otis, Alpha, Form A, Intelligence Test. The equivalency of the experimental and control groups can be seen by reference to Table 2. Of the subjects with severe articulation problems, 25 received both speech improvement and speech therapy weekly. An equivalent control group of 25 subjects received speech improvement only.

Normal Group. In the Normal Group treatment population 570 children received speech improvement, and 190 children served as controls.

Subjects. Children who received both Pre- and Post-articulation tests or Pre- and Post-reading tests served as subjects in this study. All subjects (780 girls and 782 boys) were Caucasian.

Intelligence. By using a table of random numbers (*3*, pp. 378-382), six of the 32 first-grade classes who received speech improvement were selected and tested for intelligence by the Otis Alpha Test, Form A. In addition, all of the control group subjects, all of the subjects who received speech therapy, and all of the subjects with severe articulation problems who received both speech therapy and speech improvement and their controls were tested by the same test. Results revealed that the mean IQ for those receiving speech improvement was 103.6; for those receiving speech therapy, 102.4; for those receiving both speech therapy and speech improvement, 101.5. Differences were not statistically significant at the .05 per cent level of confidence.

Socioeconomic Levels. In order to check the homogeneity of socioeconomic levels in the areas from which subjects were sampled for establishment of experimental groups, the Minnesota Scale for Parental Occupations (*9*) was applied to U. S. Census data for areas of Armstrong County, Pennsylvania. The results of this evaluation disclosed that no school attendance area was capable of being classified into any category except the combined one of V-VI. Little variability was found from one school area to another.

Articulation Testing. Both Pre- and Post-testing of articulation was completed by the staff of speech clinicians on each first-grade child. Pre-testing was done in September 1958; Post-testing was done late in May 1959. Flash cards previously employed for research purposes were used according to previously described procedures (*10*). The following 10 consonants were tested since they were stressed in speech improvement and speech therapy classes: [v], [s], [r], [l], [tʃ] [k], [ʃ], [f], [g], and [θ]. These sounds were scored as correctly or incorrectly articulated. Judgments were made for each sound in the initial, medial, and final positions.

Reliability of Articulation Testing. Five training sessions were used to increase intragroup mean agreement on judgments of the correctness or incorrectness of the 10 sounds used in the study. Live subjects were used. The same procedures and flash cards were employed as were used in the Pre- and Post-articulation testing.

The results of pairing the judgments of each rater with himself and every other rater during the actual articulation testing of 10 of the subjects in the study revealed that the percentage of mean agreement for the six raters was 89.8 per cent. In addition to this meas-

ure of intragroup reliability, a test-retest reliability for each rater was obtained by having him test and then within one week retest six subjects used in the study. Care was taken to insure that no rater knew the speech problems of children used in the reliability check. The mean agreement for the six raters using test-retest procedures was found to be 93.7 per cent. This is interpreted to mean that 94 per cent of the time the average rater agreed with himself on his judgment of correct or incorrect articulation for the 10 sounds when each sound was tested in the initial, medial, and final position.

Reading Testing. The Primary Reading Profiles reading test (*11*) was used to gain a Pre-score for each child on the following items of this test: (a) Aptitude for Reading, (b) Auditory Association, (c) Word Recognition, and (d) Word Attack.

Since first-grade children rarely have reading comprehension early in the first grade, no measurement of this factor on the test was attempted during the Pre-testing. The same reading test was used for the Post-testing at the end of the school year. All of the above reading factors were again measured and, in addition, a reading comprehension score was obtained for each child by testing the last item of the test.

Speech Improvement. The staff of speech clinicians provided 30-minute periods of speech improvement weekly in the 32 first grades which served as experimental groups for this part of the study. Classroom teachers observed the speech training during each session. Instructions and encouragement were offered so that first-grade teachers would continue a similar type of speech lesson for a short period each day during the week.

Only the 10 consonant sounds used in this study were stressed in the speech improvement classes. An attempt was made to focus particular attention on, and give special emphasis to, the most commonly misarticulated consonant sounds in any particular classroom. A class having many children who misarticulated [s], for example, then might spend many weeks working on this sound.

A typical procedure in a speech improvement class consisted of teaching a sound such as [s] for about four weeks. The entire class was taught to identify and discriminate this sound. Ear training games and exercises of many types were used to strengthen perception of the sound. After the class appeared to be capable of making easy and correct judgments of this sound, another commonly misarticulated sound was introduced and developed in a similar way. After sufficient training on the new sound, ear training techniques were presented to facilitate successful discrimination between sounds that had been learned. This procedure continued throughout the year until adequate ear training was provided for all of the 10 sounds that were misarticulated in a particular classroom. More complex discrimination exercises and games were used as the class progressed and improved in perceptual ability.

It should be emphasized that placement techniques with individual children were not utilized. When each sound was introduced, the clinician demonstrated for all the children how the sound was made and stimulated them with the sound. Individual per-

formance and mirror work were not used. Choral speaking and creative dramatics were not introduced as techniques in speech improvement. Speech improvement procedures were approached through ear training activities following procedures recommended by Van Riper (*12*, pp. 175-184) which could be adapted to entire classes of children. Home assignments for children in speech improvement classes were not given. To teach the sounds in the speech improvement classes, both auditory and visual teaching aids were widely used.

Frequent meetings of the speech staff were conducted during the course of the school year to coordinate the speech improvement activities. A variety of speech improvement materials was developed and shared. In addition, a few commercially prepared speech improvement materials were introduced.

Speech Therapy. Members of the speech staff conducted therapy classes which met for periods of about 45 minutes each once weekly. The mean number of children in each class was 4.5. Children were grouped on the basis of the particular sound phonemes that they misarticulated so that those who misarticulated [s], [r], and [θ], for example, would be in the same group. One or more of the 10 phonemes used in this study was stressed in each class.

The articulatory techniques might be classified generally as the phonetic-placement approach advocated by Van Riper (*12*, pp. 175-184) and described by Berry and Eisenson (*1*, pp. 163-164). The four steps for ear training as presented by Van Riper were stressed. Some aspects of the sound-stimulation method as described by Berry and Eisenson (*1*, pp. 162-163) and Johnson and others (*6*, pp. 126-129) supplemented the phonetic-placement method. Speech notebooks were used for home assignments. Two observation days for parents were held during the school year, resulting in the fact that about 25 per cent of the parents had an opportunity to observe speech therapy and consult with the speech teachers. Typical instructional apparatus for speech, tape recorders, mirrors, felt-boards, etc., were widely employed in the classes.

Results

Speech Defective Group. Each subject's Pre- and Post-articulation tests were compared and a difference score was obtained. Similarly, each subject's Pre- and Post-reading tests were com-

Table 3. Summary of analysis of variance for testing differences in articulation scores for groups receiving speech improvement, speech therapy, nine months, or speech therapy, three months, and controls.

Source	*ss*	*df*	*ms*	*F*	*F.01*
Between groups	261	3	87.00	6.49	3.89
Within groups	8683	648	13.40		
Total	8944	651			

TABLE 4. Results of *t* tests between articulation scores of groups of children with misarticulations who received speech improvement, speech therapy, nine months, or speech therapy, three months, and controls.

Groups	*N*	*Mean*	*SE diff.**	*t*	*Probability Level*
Speech improvement	402	3.31	.338	3.28	.01
Controls	245	2.20			
Speech improvement	402	3.31	.427	2.88	.01
Speech therapy, 9 months	69	4.54			
Speech improvement	402	3.31	.488	.35	n.s.
Speech therapy, 3 months	36	3.14			
Speech therapy, 3 months	36	3.14	.584	1.61	n.s.
Controls	245	2.20			
Speech therapy, 9 months	69	4.54	.230	10.17	.001
Controls	245	2.20			

*A correlation factor was introduced in computing this statistic since difference scores were used for each subject.

pared and difference scores were tabulated. These reading difference scores were a composite of the four reading factors previously described. In addition, measurements of reading comprehension obtained from the Post-reading tests were compared for the experimental groups. These were not difference scores. The one per cent level of confidence was selected as the significance level for this study.

Articulation. Table 3 reveals the results of an analysis of variance test designed to check for significant differences in articulation scores for subjects receiving speech improvement, speech therapy, nine months, or speech therapy, three months, and a control group. Since the *F* ratio was significant, a series of *t* tests were applied to the data to check for significant differences among the means. Because difference scores were computed for each subject, the *t* test for correlated means was

TABLE 5. Summary of analysis of variance for testing differences in reading factor scores of groups receiving speech improvement, speech therapy, nine months, or speech therapy, three months, and controls.

Source	*ss*	*df*	*ms*	*F*	*F.01*
Between groups	3340	3	1113.00	4.05	3.83
Within groups	188,720	685	275.50		
Total	191,060	688			

TABLE 6. Results of t tests between reading factor scores of groups of children with misarticulations receiving speech improvement, speech therapy, nine months, or speech therapy, three months, and controls.

Groups	*N*	*Mean*	*SE diff.**	*t*	*Probability Level*
Speech improvement	402	36.56	1.81	2.61	.01
Controls	245	31.83			
Speech improvement	402	36.56	1.69	2.98	.01
Speech therapy, 9 months	69	31.53			
Speech improvement	402	36.56	1.97	2.51	.01
Speech therapy, 3 months	36	31.62			
Speech therapy, 3 months	36	31.62	2.17		n.s.
Controls	245	31.83			
Speech therapy, 9 months	69	31.53	2.65		n.s.
Controls	245	31.83			

*A correlation factor was introduced in computing this statistic since difference scores were used for each subject.

applied. Table 4 shows the results of these analyses among the means of these four experimental groups.

Both the speech improvement group subjects and the speech therapy, nine months, subjects improved significantly in articulation compared with the control group subjects. The subjects who received speech therapy for three months did not improve significantly in articulation compared with the control group. Neither did the speech therapy, three months, group achieve a significant improvement compared with the speech improvement group. The means of 3.31 and 3.14 were essentially the same. The speech therapy, nine months, group, however, improved significantly compared with the speech improvement group in articulation.

Reading Factor Scores. Table 5 shows the results of an analysis of variance test designed to reveal significant differences among the means of the experimental groups. Since the resultant F was significant, a comparison of group means was performed.

Table 6 represents the result of a series of t tests of the mean of the experimental groups. The mean difference of the four reading factors for subjects in the speech improvement group was found to be significant compared to that of each of the other experimental groups. No significant differences were found between subjects who received speech therapy and control group subjects.

Reading Comprehension Scores. The Post-reading tests were used to obtain reading comprehension scores for subjects in each experimental group. Table

TABLE 7. Summary of analysis of variance for testing differences in reading comprehension for groups receiving speech improvement, speech therapy, nine months, or speech therapy, three months, and controls.

Source	*ss*	*df*	*ms*	*F*	*F.01*
Between groups	724	3	241	2.21	3.83
Within groups	74,639	685	109		
Total	75,363	688			

7 presents the results of an analysis of variance test of these reading comprehension scores for each experimental group. The resultant *F* failed to reach significance. The mean reading comprehension score for the speech improvement group subjects was 32.54; for the subjects who received speech therapy for nine months, 29.50; for the subjects who received speech therapy for three months, 29.86; and for the control group subjects, 30.14.

Matched Groups. The effects of providing both speech therapy and speech improvement to a group of first-grade children having six or more defective consonant sounds were determined by use of *t* tests for related means. Differences between Pre- and Post-scores were again used.

Articulation. The mean for the experimental group which received both speech therapy and speech improvement was 7.82 with a standard deviation of 3.86. The mean of the equivalent control group subjects who received speech improvement only was 3.05 with a standard deviation of 4.17. The resultant *t* of 14.2 (df=24) was significant at the .001 level.

Reading Factor Scores. The mean for the experimental group subjects was 36.65 with a standard deviation of 13.98. The control group mean was 36.33 with a standard deviation of 11.54. The resultant *t* of 1.19 (df=23) was not significant.

Reading Comprehension Scores. For the experimental group subjects the mean was 31.47 with a standard deviation of 6.94; for the control group the mean was 29.64 with a standard deviation of 8.07. The *t* of 8.16 (df=23) was significant at the .01 level.

Normal Group. The effects of speech improvement on reading factors and reading comprehension scores were studied as they were for subjects in the Speech Defective Groups. Pre- and Post-tests provided difference scores of the four reading factors. The Post-reading tests provided reading comprehension scores.

Reading Factor Scores. The *t* test for related means was used. The mean for the group of 570 subjects in the experimental group who received speech improvement was 37.58 with a standard deviation of 12.35; the mean for the control group of 190 subjects who did not receive speech improvement was 34.83 with a standard deviation of 12.11. The *t* of 6.19 (df=189) was significant at the .001 level.

Reading Comprehension Scores. A *t* test for unrelated means was applied to

the Post-reading comprehension scores. The experimental group mean was 34.90 with a standard deviation of 9.47; the control group mean and standard deviation were 34.40 and 10.57, respectively. The resultant t with 759 degrees of freedom was 1.47 and was not significant.

Conclusions and Discussion

Within the limitations of the design of this study and for the population studied, the following conclusions appear warranted:

1. Nine months of weekly speech therapy provided significantly more improvement in articulation of first-grade children than a comparable period of speech improvement.

2. Speech improvement was found to improve articulation significantly.

3. Three months of weekly speech therapy proved to be about as effective in improving articulation as nine months of speech improvement.

4. Speech improvement was effective in producing significantly higher reading factor scores for groups of first-grade children normal in articulation and also for first-grade children with misarticulations.

5. Speech therapy did not affect reading factor scores.

6. A combination of speech therapy and speech improvement administered to a group of first-grade children with many misarticulations matched with a group who received speech improvement only resulted in (a) a significant difference in reading comprehension, (b) no significant change in reading factor scores, and (c) a significant improvement in articulation.

Some agreement can be found in the results of this study and findings of Jones (*5*), who used normal second-grade subjects. This agreement may be seen in the significantly higher reading factor scores produced by speech improvement and was observed for children in the Normal Group and in the Speech Defective Group. The finding that speech improvement can result in a significant improvement in articulation agrees well with results of research by other investigators (*7*, *8*, *13*).

The data suggest that speech improvement, as used in this study, does not affect reading comprehension scores at the first-grade level in any significant way. This finding may not be surprising in view of the fact that children at this educational level are just beginning to master a complex skill. A speculation derived from this point of view is that any significant improvement in reading comprehension may emerge in subsequent grades. A follow-up study is underway to investigate this hypothesis. Other follow-up studies are planned to explore the effects of various durations of speech improvement in the correction of defective articulation at both the first- and second-grade level. Other questions of importance deserving research concern the types of misarticulations most amenable to improvement by a speech improvement program and the comparative effects of various approaches to speech improvement such as creative dramatics versus analytical ear training.

Also worthy of further investigation is why a combination of speech improvement and speech therapy produced significantly higher reading comprehension scores in a group of children with severe articulation prob-

lems. Although no ready explanation exists to explain this occurrence, the authors suggest that the increase in verbal language experience afforded by these two treatments may explain the phenomenon. It is conceivable also that the extra attention to these subjects in this combination of treatments may have induced certain psychological variables which influenced results. A number of important questions need research concerning effects of various speech correction treatments on children with severe articulation problems.

The Carter and Buck Prognostic Speech test was found to be an excellent predictor of the improvement in articulation of the 25 children with severe articulation problems who received both speech therapy and speech improvement. The predictive validity of this test was found to be +.56 (rho) when ranking was accomplished using articulation improvement and prognostic speech scores. Although the Carter and Buck test was found to have real value in predicting improvement when speech improvement and therapy were administered to these subjects, the six speech clinicians who used the test found that it required, on the average, 45 minutes per subject to administer. Because of the large case loads in many schools, this expenditure of time may be excessive if many first-grade children with severe articulation problems are to be tested.

Summary

The effects of speech improvement and speech therapy upon the articulation and reading of first-grade children were explored. Classes were randomly sampled to receive speech improvement, speech therapy for nine months, or speech therapy for three months. Three populations were studied: (a) 752 children defective in one or more of 10 consonant sounds, (b) 760 children with normal articulation, and (c) two matched groups of 25 children with severe articulation problems.

Speech improvement was found to affect reading skills, as expressed in reading factor scores, in a significant way. Reading comprehension scores for children with misarticulations and for children with normal articulation were not significantly changed by speech correction procedures except in a matched group of 25 children with severe articulation problems. Speech therapy did not affect reading factor scores in any significant way.

Articulation was improved significantly more by speech therapy than by speech improvement. Three months of speech therapy appeared about as effective in reducing articulation errors as nine months of speech improvement. Children receiving speech improvement improved significantly in articulation compared with controls. Children with severe articulation problems improved significantly when they received both speech therapy and speech improvement compared with a matched group who received speech improvement only.

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Problems in the Measurement of Bone Conduction

• *Alan S. Feldman*

In clinical audiometry the measurement of cochlear reserve is both critical and highly controversial. The preferred means of obtaining the pertinent information is by bone-conduction audiometry. Yet the reliability of bone-conduction testing has been repeatedly questioned. As an indication of its importance one need only witness the increasing need for accuracy dictated by modern surgical techniques and other means of rehabilitation.

In any measurement one must contend with a number of variables. Bone-conduction audiometry is not unique in this respect. Instrumentation, psychophysical technique, and the mechanism of bone conduction itself are all potential sources of error. In a large part, these variables are subject to control. The excessive variability persists only because the controls which have been tested both in laboratory and clinic have not been utilized to a sufficient degree in the clinical setting.

This paper considers several of the important variables for which adequate control has been offered. They involve all phases of the measurement of bone conduction but are basically concerned with the problems related to the mechanism of bone conduction.

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Mechanism of Bone Conduction

Békésy (*3*) has observed that stimulation by bone conduction is an inefficient way of end-organ stimulation. Stimulation in this fashion is not direct, but rather involves a variety of pathways. It is too often assumed that a vibrating body which is brought into contact with the skull exerts its influence solely upon the labyrinth by means of compression of the bony capsule. Instead, Békésy (*3*, 7) and Bárány (*2*) have defined three distinct forms of vibration, each of which functions to some degree in our everyday clinical measures. Stimulation of the skull does certainly result in compression or dilation of the bony capsule of the labyrinth, causing a displacement of the perilymph. Békésy refers to this displacement of fluid within the cochlea as labyrinth bone conduction. The attainment of this measure in a clinical setting is complicated, however, by two other types of conduction. The function of the middle ear cannot be ignored. Its contribution to displacement of fluid in the cochlea arises from the fact that compression of the middle ear and inertia of the ossicular chain produce additional stimuli to the cochlea through the oval window. The final middle-ear contribution is attributed to

the movements of the lower jaw relative to the skull, which produce airborne sounds in the ear canal. It is this triad of mechanisms which Békésy (7) has labeled 'clinical' bone conduction.

In the normal ear, the contribution of the lower jaw and the middle ear may be varied by means of occlusion of the canal and changing the site of stimulation. In the pathological ear the effect of these factors may be further varied. What remains practically constant is the labyrinth bone conduction itself. A recognition of the effects of these variables is of some importance.

Occlusion of Ear Canal

The occlusion effect refers to the marked changes in threshold produced by blocking the external auditory meatus (*3, 18, 19*). Such a blockage may improve bone-conduction thresholds by as much as 25 db for lower frequencies, with little or no effect beyond 1500 cps (*24, 27*). The primary source of this apparent improvement may be attributed to a result of the vibration of the lower jaw (*3, 5*). These vibrations differ in phase and amplitude from those of the skull and result in deformation of the soft part of the wall of the ear canal. When the canal is occluded, the vibrations produce a sound pressure which acts upon the ear drum in the same fashion as airborne sound. As a result, there is a perception of increased intensity, or an improvement of threshold. When impairment of middle-ear function exists the occlusion effect is eliminated (*21*). This phenomenon is not newly recognized. The Bing test, initially applied to tuning forks, was based on the occlusion shift. As a quick screening device to differentiate between conductive and perceptive impairments, it was recognized that for bone-conducted stimuli alternate occlusion and unocclusion of the external canal will result in the perception of an intermittent or warbling tone in nerve losses, but a steady tone in most conductive impairments.

In nerve losses, when the middle ear is normal, the contribution of the lower jaw to bone conduction is equivalent to that in the normal ear. For conductive losses the pathology of the middle ear interferes with the transmission of sound generated in the ear canal by the lower jaw, so that the shift in bone conduction with occlusion does not occur. At the same time some conductive losses will result in an improvement in bone conduction. But this shift will not always occur and many conductive impairments fail to produce an improvement in bone-conduction thresholds.

Awareness of the workings of the occlusion shift is an important detail in clinical bone-conduction measurement. It has been suggested that when bone-conduction thresholds are tested, the ear under test be occluded (*12*, p. 253, *15*), in addition to the necessary occlusion of the ear being masked. In this instance there are at least two problems which would arise. The first is the inter-subject variability of the occlusion effect, which is quite high (*23, 24*). The second is that the occlusion effect would differ according to pathology (*15, 23*). While the occlusion of the ear must always improve bone conduction in nerve losses, the middle-ear impairment can cause a simulated occlusion effect, and it also may frequently cause a hearing loss by bone-conduction. Witness the effect of otosclerosis in producing a mechanical

shift in bone-conduction thresholds (*8*) and Békésy's finding of reduced bone-conduction thresholds following radical mastoidectomy (*4*). Palva and Ojala (*17*) have reported similar findings in 15 of 42 cases of otitis media.

The occlusion of the ear under test introduces new, and not easily controllable, variables. This is always undesirable. It is more accurate to leave the ear under test unoccluded and mask out any occlusion effect produced by the masking earphone.

Placement of Oscillator

Traditionally, bone-conduction thresholds are obtained by testing with the vibrator placed on the mastoid. This practice probably carries over from tuning-fork procedures.

Ironically, the mastoid appears to be the *least* favorable site for bone-conduction testing (*2*, *6*, 7). The middle ear seems to have its greatest influence from this point. In order to reduce further the effect of the middle ear, it has been suggested that the site of stimulation be altered. Bárány (*2*) found the inertia component to be least effective from the vertex of the skull. Others have suggested midline forehead placement as a more favorable site (*3*, *12*, p. 252, *13*, *15*, *23*). Such a procedure seems to reduce the effect of most components of bone conduction other than labyrinth bone conduction. Link and Zwislocki (*13*) experimented with forehead placement, using patients with middle-ear pathologies, and found the pathology to exert less influence upon bone conduction from the midline than it does in mastoid placement. This technique provides a highly desired control over the variables introduced by the middle ear.

Midline placement of the vibrator has additional advantages. Among them is the control of frequently criticized limitations of mastoid placement. At the forehead bone density and skin thickness vary less, hair and cartilage do not interfere, and air-conduction leakage through the vibrator is less of a problem. Furthermore, there is a reduction of localization by virtue of suggestion. Placement behind the ear not only suggests to the patient that this is the ear in which the sound is heard, but also suggests it to the tester. Often it is the patient who points out that both test signal and masking signal are being perceived on the same side. Moving the vibrator away from the ear under test would serve to minimize this element of suggestion.

About the only limitation the forehead placement really possesses is a slight reduction in sensitivity. The threshold is about 10 db higher at the forehead than at the mastoid (*13*, *15*). As all measurements are somewhat contingent upon compromise, this one limitation of midline placement should prove negligible.

Cross Hearing

One of the major problems in testing bone-conduction thresholds is the fact that any stimulation of the skull, regardless of site, effectively activates each end organ (*1*, *2*, *3*, *25*, *26*). Although one cochlea is independent of the other, any attempt at direct bone-conduction stimulation of one necessarily produces a stimulation of the other. This recognition has forced a restatement of masking policies, which, for bone conduction, has been based upon the 'erroneous' assumption that there is a reduction in intensity in the

order of 10-15 db across the skull (*12*, p. 253, *15*). Many factors affect the perception of sidedness resulting from stimulation by a bone-conduction vibrator. Among these are differences in threshold and phase. *The perception of sidedness should not detract from the fact that stimulation is bilateral and acoustic attenuation across the skull is negligible.*

Use of the phenomenon of lateralization has been advocated in recent years. It has been suggested that rather than mask at all times when testing bone conduction, the audiometer Weber test be used as an indication of need for masking (*11*, p. 51, *14*, *16*, p. 84). Many clinicians have adopted this technique as a routine procedure: testing bone conduction unmasked for the ear to which the tone lateralizes and masking when testing the contralateral ear. A major problem arises here, as lateralization occurring from the midline may be reversed at the mastoid or it may not occur at the midline but be present at the mastoid. It is not unusual to observe instances where the only way of producing the desired lateralization is by placing the vibrator on the opposite mastoid. To produce the desired lateralization the clinician may have to resort to quite unorthodox methods. The orthodox approach, however, is to apply the rule of routine masking of the contralateral ear when measuring bone-conduction thresholds. *The safest principle to adhere to is that no testing may proceed without excluding the possibility of the response being controlled by the untested ear.*

Masking and Cross Hearing

The usual means of preventing the reception of the stimulus in the untested ear is masking. The currently used masking stimuli, white or saw-tooth, are broad-spectrum noises. It is known that the efficiency of masking depends upon the frequency spectrum of the masking stimulus (*10*, chaps. 10, 11, *22*, chap. 4). That is, low frequencies efficiently mask the lows and high frequencies efficiently mask the highs. White noise has been advanced as an ideal masking source because it contains all frequencies equally represented. Such a stimulus is really not as efficient as one might be led to believe. As Zwislocki (*28*) has observed, there are three basic problems involved in the use of any broad spectrum masking stimulus: (a) In order to obtain a sufficient level of effective masking the loudness is frequently annoying and distracting. (b) At effective masking levels the sound energy of the masking stimulus is sufficient to mask the ear under test as well as the ear under mask. Only a small portion of the total spectrum of the noise is actually providing the masking. The major effect of the remainder of the spectrum is to add to the loudness. (c) The ear, not being equally sensitive to all the frequencies in the spectrum, is not as efficiently masked at each frequency by identical intensity levels of the masking stimulus. If they refer to anything, the attenuation dials for masking on the audiometer probably refer to output or effective masking at 1000 cps. The problem which arises when a patient with a bilateral air-conduction impairment of 30 db is tested for bone conduction should be considered. In order to overcome the hearing loss barrier and effectively mask at 1000 cps, the noise level must be as high as 90 db SPL; but

to provide masking for a comparable loss at 250 cps, a far less sensitive point of the ear, the masking level should be at least 20 db greater, or 110 db SPL. This output is in excess of the capabilities of most audiometers. Furthermore, when the 90-db level has been reached, the masking at 1000 cps is effective on both sides of the skull.

Because attenuation across the skull for air-conducted stimuli is on the order of 50 db, depending upon frequency, and effective masking stimuli must generally exceed this level, the clinician frequently encounters the problem of overmasking when testing bone conduction. Though not as critical for neural losses, this problem is particularly evident for conductive impairments where a normal end-organ threshold exists. The attenuation produced by the conductive barrier and lateralization force the use of more intense masking, which results in binaural stimulation by vibrating the skull with a stimulus that originated as an air-conducted stimulus.

The problem, then, is how sufficient masking may be obtained on one side of the skull without interference on the other side. The first aspect, the masking stimulus, is amenable to control. The use of a narrow-band masking stimulus would be a far more efficient means of providing the desired selective activation of the cochlea with a minimum of loudness (*9*, *15*, *23*, 27, *28*). Based on the concept of the critical band (*10*, chaps. 10, 11), the narrow-band masking signal contains only a narrow acoustic spectrum on either side of a given frequency. The threshold of the narrow-band noise, approximately the same as the test tone, can be calibrated with ease. A narrow-band masking signal can be produced by simple electronic means which would not significantly increase the cost of the audiometer. It can be automatically adjusted to the frequency output of the test tone (*28*).

Another solution has been discussed by Békésy (*6*), Zwislocki (27), and Studebaker (*23*). Acoustic attenuation across the skull may be significantly increased from 50 to 80 db or more, depending upon frequency, by use of an insert type of earphone. The technique has been applied for masking and it provides a means of achieving a far greater range of maximum masking levels than available with standard earphone cushions. Thus, effective masking may be achieved without constant concern about overmasking.

In addition to the controls which have been discussed, there has been recent interest in the use of another technique for the measurement of bone conduction. The technique is based upon the work of Rainville (*21*) and involves obtaining a threshold measurement by measuring the amount of air-conduction threshold shift which results from masking applied by bone conduction. Despite the distinct advantages this method appears to offer, disadvantages based upon problems of instrumentation and the lack of control over the occlusion effect imply that it is not yet ready for routine clinical application.

Summary

The suggestion is advanced that consideration be given to the following available controls of some of the variables encountered in clinical bone-conduction audiometry: (a) adherence to the traditional procedure of testing bone

conduction with the tested ear unoccluded, (b) placement of the vibrator on the forehead to reduce the effect of the middle ear upon threshold measurement, (c) application of narrow-band noise as the masking stimulus to provide a more efficient masking signal, and (d) use of insert earphones for masking to provide additional attenuation across the skull and thus permit higher intensity levels for the masking stimulus.

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Preschool Education of Deaf Children

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Recent years have seen increased emphasis on the importance of preschool education of deaf children, with discussions and recommendations concerning methods, curricula, and materials for teaching the young deaf child. However, little research has been done to test the merits of varying and often conflicting approaches (*10*, chap. 3). Even within the framework of the oral method, methodologies range from the most to the least formal, and most analytic to the most synthetic; but one may probably speak with confidence of two schools of thought: the 'traditional' or formal in contrast to the 'natural' or contextual methods of introducing language learning to the young deaf child. Groht (*5*) reports an early pilot study designed to evaluate the effects of such contrasting educational philosophies and methodologies on the ease and efficiency of speech and language learning of two groups of preschool deaf children in the same school.

In 1948 the Department of Child Study of Vassar College, on invitation of Junior High School 47 (JHS 47) of New York City, cooperated in the inauguration of a revised preschool program. This new program was characterized by (a) an enriched nursery school program modelled on accepted practices in nursery schools for hearing children and (b) the early use of individual hearing aids (*9*, *14*).

In the original preschool program at JHS 47, started in 1942, formal reading and speech training had been introduced at a very early age in an effort to prepare the deaf child for first grade at six years of age and, hence, to lessen his ensuing educational retardation. The later realization that the children with such early formal training were not appreciably more advanced in language development at the fourth-grade level, plus the observation of the Vassar staff that children thus taught appeared to show rather rigid personalities (*2*, pp. 33, 158, 165), brought about the shift in emphasis in the new teaching program inaugurated in 1948.

The earlier preschool program had been characterized by a core of speech

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training emphasizing drill on isolated sounds and single words, embedded in a rather meager play program supervised by non-nursery-trained personnel. The enriched program emphasized the learning of speech in the context of nursery school play, with teachers who were trained teachers of the deaf but who had received additional nursery school training at the Vassar Summer Institute. The teachers entered into the spontaneous play situations and talked to the children, talked even more than in a hearing school, in order to stimulate a holistic, contextual grasp of communication through speech and lipreading. Young deaf children taught in this way, it was believed, would not only learn speech more 'naturally' but would also have a chance to live through their early preschool years without the added handicap of deprivation of natural play experiences which normally stimulate the learning of the young child (*2*, chap. 1).

Reading was postponed until the standard time for such instruction, sometime during the first grade. This program has been described in more detail by its JHS 47 staff participants (*9*, *14*).

In addition to the major change of emphasis, the school planned to have each child wear an individual hearing aid as soon as possible after his entrance into preschool classes. While it was recognized that group aids would provide amplification of higher fidelity than individual aids, the individual aids were considered to have the advantage of providing auditory stimulation in the meaningful context of the child's play as he moved around freely (*4*). The prescription of hearing aids for two- and three-year-old deaf children is rather widely accepted practice today, but at the time it was initiated at JHS 47 it was still considered by many as a radical and controversial recommendation. Because the children were so young, no dependable measures of degree of hearing loss were available for them at that time; but it was assumed that, as with any group of deaf children, most of them would have some residual hearing which might be stimulated by the amplification.

It was hypothesized that as a result of the revised program the children would show benefit in personality development, manifesting greater spontaneity, curiosity, and independence, with perhaps less uneasiness in new or uncharted situations. This hypothesis assumed that the tendency toward such frequently observed behavior as dependence, overdocility, and rigidity in the deaf was related, at least in part, to the nature of the educational techniques they commonly encountered. It was also expected that the children in the revised program, with a richer background of experience, would eventually make more rapid progress in school subjects and would show more breadth and depth in learning, although they might show some temporary retardation in specific language learnings in which children of the previous years' program had been drilled.

Procedure

During the years 1948-1952 the authors with various members of the Vassar Child Study Department and other consultants observed the program closely, conferred with the administrators and teachers at JHS 47, and obtained many observational reports and other

qualitative records of its progress. Obviously the impressions of these observers, despite their unanimity, were insufficient for testing the results of the program or for carrying conviction to those outside the school who might consider the adoption of similar programs for preschool deaf children. It was decided, therefore, to make a final objective evaluation of the benefits of the program. This paper deals mainly with the data gathered in the 'Evaluation Year' of 1952-1953.

The experimental (E) group in 1952-1953 consisted of 12 of the original 25 who entered the youngest preschool class in 1948-1949. In March 1953, then in second grade, these children ranged in age from 6-11 (6 years, 11 months) to 7-8 with a median age of 7-2. The control (C) group consisted of 15 of the original 24 children of the 1947-1948 preschool class taught under the 'old' program. In March 1953, the C group, then in third grade, ranged in age from 7-11 to 8-9 with a median age of 8-3.

TABLE 1. Descriptive data for experimental (E) and control (C) groups.

	E Group	*C Group*
Number	12	15
Age		
Range	6-1 — 7-8	7-11 — 8-9
Median	7-2	8-3
Sex		
Boys	5	7
Girls	7	8
Socioeconomic status: mode*	3	3
Deafness		
Onset		
Birth	12	12
1-14 mos.	0	3
Etiology		
Congenital	12	12
Rubella	0	1
Misc.	0	2
Degree		
Range	67-100 db	75-110 db†
Mean	90.3 db	92 db
Familial deafness		
Parents		
One	1	0
Both	1	2
Siblings: one	3	5

*Estimated by rating of father occupations on a 5-point scale.
†Better ear, for frequencies 512, 1024, 2048, as measured in 1952-1953.

TABLE 2. Comparison of intelligence test scores for experimental (E) and control (C) groups on Goodenough Draw-a-Man Test and Pintner Non-language Primary Mental Test.

Test	*Group*	*N*	*Mean IQ*	*t*	*P*
Goodenough	E	12	112.7	1.45	N.S.
	C	14	104.1		
Pintner	E	10	124.5	1.43	N.S.
	C	15	116.5		

In most of the comparisons made during 1952-1953 the C group was roughly one year older and one year more advanced in school than the E group. For practical reasons no individual matching of children was possible. There was no evidence, however, of any special selective factors operating, and descriptive data for the two groups in 1952-1953 revealed no significant differences in socioeconomic status, in etiology or degree of hearing loss, or in intelligence, as far as mental ability could be determined by applicable performance tests. Tables 1 and 2 present these data.

Measurements were obtained comparing E and C groups in educational achievement and personality development. Studies in educational achievement included both speech and language progress and academic achievement.

Speech Production. A number of measures were obtained to determine the possible effects of the revised program on speech development and school achievement. A Speech Picture Test was devised using 10 pictures randomly selected for each child from a pool of 31 and presented to the child by an experimenter, a trained teacher of the deaf, who was familiar to him. The child was first shown a few introductory pictures and invited to 'tell me about this.' The 10 test pictures were then introduced in similar fashion. The test was administered individually during the same period of time for E and C groups, hence at a time when the C group was a year older than E.

High-fidelity tape recordings were made with a Magnecorder (Type PT-63J6AH, operating at 15 ips, and with a Western Electric cardioid microphone (No. 639A) for later analysis of speech intelligibility and voice quality. The room was not acoustically treated and there was some interference from street noises and surrounding classrooms. The microphone was placed about 18 inches from the child. From this speech production test the following scores were obtained:

Volubility as Total Word Score (E-O Score). Full stenographic records were made by an observer (O) during the administration of the test and supplemented immediately thereafter by the experimenter (E). The total number of intelligible words was counted.

Volubility as Listeners' Score (L-Score). The tapes, with coded identification, were sent to a speech consultant[1] for analysis. Five students, trained in listening to deaf speech, listened to the tapes with the pictures before them, so that they knew the context of the speech, and made a count of the number of intelligible words used by each child (*6*).

Intelligibility. The degree of intelligibility was computed by the ratio of Listeners' Score to Total Word Score.

Complexity. The number of sentences spoken by each child was noted. Single words and phrases were distinguished from true sentences. Counts were made from the pooled stenographic records.

Quality. The speech consultant evaluated speech quality from the taped recordings in terms of inflection, phrasing, fluency, and rhythm.

Speech Perception. An Oral Instruction Test was administered to each child immediately following the Speech Picture Test. A series of speech-reading sentences was developed based on one of the pictures from the latter test and presented in order of increasing complexity. The following sentences are examples taken from the series: '(a) Show me the ball. (b) Where is the baby? . . . (j) Some boys are fighting. They are on the sidewalk. They are not in the playground. Can you find them?' Skill in speech-reading these sentences was measured by the number of correct responses.

Reading Achievement. As the best indication of academic progress, two measures of reading achievement were made for each child at the end of third grade.

Quantity. The number of both textbooks and 'free-choice' books read by each child by the end of the third-grade year was reported by the teachers.

Quality. A scaled rating indicated

[1]C. V. Hudgins, Director of Research, Clarke School for the Deaf.

the difficulty level of the last textbook finished or in process of being read by each child at the end of third grade. A scale of *1* to *5* was employed, *1* representing the primer and *5*, the second-year, second-term level of difficulty, in terms of expectations for hearing children. It should be noted that in these reading comparisons E and C children were of the same age.

Personality Development. The personality aspect of the research is mentioned only briefly in this article since most of the data were of a qualitative, impressionistic nature gathered before the Evaluation Year. It was in personality development that greatest gains were expected from the revised program, though these were expected by some critics of the program to take place at the expense of language development. Beginning in 1948-1949, observations were made and recorded by a large number of personnel: members and consultants of the Child Study Department, students from Vassar and the New School for Social Research, school supervisors, and other personnel of the New York City Board of Education.

During the Evaluation Year an attempt was made to obtain more objective evidence of personality gains. Several play sessions were held with each child, using such techniques as the Miniature Life Toys (MLT) (*7*) and the World Test (*1*, *8*, *11*). Briefly, these projective data were analyzed as follows: The MLT data were examined by Gabrielson's (*3*) method to ascertain (a) the child's relation to the experimenter, (b) use of gestures, (c) verbalization, (d) use of aggressive toys, (e) response to broken toys, and (f) complexity of play. For analysis of the World Test data Buhler's (*1*) scoring system of 'signs' of emotional disturbance was used. In addition, a nine-point 'Scaled Score' described by Schoenberger (*11*) was employed for finer discrimination. A functional World Scale, designed to measure degree of integration and functional organization, as well as a Toy Selection Scale, designed to measure the degree of freedom a child evidenced in choosing toys in his play, were also applied by Schoenberger as part of the present study and described in more detail elsewhere (*11*). In both studies the E and C groups were compared with additional control groups of hearing children.

Limitations

Ideally it might have been desirable to compare the following groups: (a) children with enriched educational experience but without hearing aids, (b) children with hearing aids but without the enriched educational program, (c) children with both enrichment of educational experience and hearing aids, and (d) children with neither. For practical reasons such a design was impossible. This was research at all times limited by the demands of a school program in action; the groups had to be studied as they existed, not changed, matched, or controlled in any way. Theoretically, both educational enrichment and the early and lavish use of hearing aids were present in the E group and not in the C group. However, it must be made clear that, again for practical reasons, there was a weakening of the distinctions between the E and C groups in the following ways: (a) The two groups, because of administrative sorting each year, did

not stay together as intact E and C groups after the three preschool years. The E group was originally a group of children interacting in a commonly experienced program with the same teachers through the three preschool years. From first grade on they were a series of small clusters of individuals within several larger classes of children, classes with different experiences and with teachers differing in their adherence to and skill in applying the new program. This diluted the impact of the experimental program after the preschool years so that the studies in the Evaluation Year measured largely the residual effects of the preschool program. (b) Moreover, it took some time to establish the new program in the E group. Hearing aids were scarce until the end of the second year and children had to 'take turns.' The educational program was hampered also because new play materials were late in appearing and the preschool rooms themselves were inadequate until their final renovation in 1951-1952. (c) Finally, the 'old' approach could not be rigidly maintained in the C group. There were such 'leaks' as the use of individual hearing aids by children whose parents supplied them: nine of the Group C children were regular users of hearing aids by the time they were in third grade. In addition, some aspects of the 'new' methodology were adopted by some teachers of the C group, particularly after the first year when benefits of the new program seemed obvious to many of the staff.

For these reasons, then, there was a dilution of the experimental program on two counts: (a) imperfect and delayed realization of the program for the E group and (b) some leakage of new procedures to the C group. These factors weakened, without obliterating, the crucial differences in the handling of the E and C groups. Hence, results favoring the E groups should be regarded as indicating only the minimum effectiveness of the critical variables: early use of hearing aids and enriched educational program.

Results

Long before the final Evaluation Year it became so evident to the school administrators, teachers, and outside observers that the E group was a freer, happier, more 'normal' group of children, that the new program was adopted and strengthened for all children entering the preschool in subsequent years. There was unanimous agreement that the E group, in general, was also more enthusiastic about school life, more involved in group relations, more self-reliant, more expressive, and interested in a wider range of activities. Teachers of the group, pooling their impressions over several years, felt that 'on the spot' context teaching of speech and language had proved itself. Other teachers and administrators in the school who met the children casually in lunchrooms or halls noted that they had a feeling for speech and a desire to communicate verbally on their own initiative not seen in earlier preschool groups. As one teacher of the upper grades expressed it, 'Before, the children went about in their own silences.' Teachers and supervisors also reported that they could no longer measure speech and language development of the E group children in terms of word lists, that is, that it was impossible to record systematically all the words used by most of the children in

TABLE 3. Achievement in speech production: comparison of groups E and C.

Comparison	N*	E-O Scores		Volubility	L Scores		Speech Complexity Number of Sentences	
		Mean	t	Variance within Groups-F	Mean	Between Groups Variance-F	Mean	t
1. All E	12	163.9	2.05†	4.49†	59.7	101.86**	28.7	1.92†
All C	15	79.4			24.3		11.7	
2. E-aids	11	174.9	1.57	N.S.	65.1	61.44**	30.9	1.11
C-aids	9	96.9			33.2		18.2	
3. E&C-aids	20	139.8	3.30**	34.25**	50.9	49.85†	25.2	3.98**
E&C-no aids	7	51.7			11.5		2.1	
4. C-aids	9	96.9	1.66	12.68†	33.2	121.68**	18.2	2.38†
C-no aids	6	53.2			12.4		1.8	
5. E-aids	11	174.9	2.84**	39.14**	65.1	10.71**	30.9	3.26**
C-no aids	6	53.2			12.4		1.8	

*All comparisons deal with the Ns shown in this column except for the L scores where one defective tape in each group reduced the respective Ns to 11 and 14 for Comparison 1; 10 and 8 for Comparison 2; 18 and 7 for Comparison 3; 8 and 6 for Comparison 4; and 10 and 6 for Comparison 5.

†Significant at or beyond .05 level.

**Significant at or beyond .01 level.

the E group (many of them 'too difficult' words not taught previously) because their vocabularies were too large and too varied.

In approaching the data of the Evaluation Year, despite the absence of the ideal experimental design, it was possible to take advantage of the unplanned variations in use of hearing aids to obtain some measures of the influence of each of the experimental variables by itself and when operating together. (The criterion of hearing aid use was simply whether or not the child regularly wore an aid in school during the Evaluation Year.) The results are organized in terms of the following five comparisons: Comparison 1, E group vs C group, a gross comparison of the combined effect of the two variables; Comparison 2, E group Ss with hearing aids vs C group Ss with aids, a comparison of the effect of the two teaching methods in the presence of aids; Comparison 3, all Ss of E and C groups wearing aids vs all Ss without aids, a measure of the effectiveness of hearing aid use regardless of teaching method; Comparison 4, children in C group with hearing aids vs those in C group without aids, a measure of the effectiveness of hearing aid use in the absence of the new teaching methods; Comparison 5, E group children with hearing aids vs C group children without aids, a 'purified' comparison of the combined effect of the two variables as grossly examined in Comparison 1. Tables 3 and 4 present some of the

TABLE 4. Achievement in reading: comparison of groups E and C.

Comparison	Number of Books		Level of Difficulty	
	Mean	t	Mean	t
1. All E	6.8	2.36*	3.2	1.97*
All C	2.1		2.4	
2. E-aids	7.3	2.38*	3.3	2.00*
C-aids	2.3		2.4	
3. E&C-aids	5.1	2.62†	2.9	1.47
E&C-no aids	1.7		2.3	
4. C-aids	2.3	0.47	2.4	0.37
C-no aids	1.9		2.3	
5. E-aids	7.3	2.52*	3.3	1.76*
C-no aids	1.8		2.3	

* Significant at or beyond .05 level.
† Significant at or beyond .01 level.

data from these comparisons; other findings are presented in the text.

Speech Production. Volubility as Total Word Score (E-O Score). (See Table 3.) In Comparison 1 the E group achieved a significantly higher mean score than the C group, a difference which remained even after the significant difference in variance in the two groups was taken into account.

In Comparison 2 the heterogeneity of variance disappears and the mean difference in total word scores, though in the same direction, is not significant. It appears here that the teaching atmosphere is less effective and that the significant difference found in Comparison 1 may be primarily due to the use of hearing aids. If this is the case, the largest and most significant difference might be expected to occur in Comparison 3.

Comparison 3 indeed provides a highly significant mean difference between all the children wearing aids and those not wearing aids, with a significantly greater variance in the group wearing hearing aids.

In Comparison 4 the mean difference, while in the expected direction, does not reach statistical significance, but there is a significantly greater variance among those in group C with hearing aids. This suggests that the use of hearing aids alone may not be sufficient to bring about the improvement in speech production noted in Comparison 3.

In Comparison 5, the 'purified' comparison of the effect of both variables, there is again a statistically significant difference in favor of the E group, as well as greater variance in total word scores.

Volubility as Listeners' Scores (L-Score.) In dealing with the L-Score data, analysis of variance was employed to test the significance of the variation introduced by the different judges. Variations in judgments were taken account of in an analysis of variance arising from (a) differences among judges, (b) differences between E and C groups, (c) interaction, (d) variation among individual subjects. Table 3 shows that significant differences were

found in each comparison between the groups. All the differences were in the expected direction. Variances for judges and for interaction were in no case significant and are omitted from the table.

It might well be asked whether the more voluble children were those with more residual hearing or more intelligence. The correlations between volubility and intelligence were +.27 and +.28 for the Pintner and Goodenough tests, respectively; volubility correlated —.38 with degree of hearing loss. None of the correlations was significant.

As one would expect from the congruence in the findings for the two indices of speech volubility, the agreement between the two measures (E-O and L scores) is high. For all of the subjects (N = 27) the correlation is .91, significant beyond the .001 level. The two sets of measures would appear to be virtually interchangeable as indices.

Intelligibility. The same model for analysis of variance was used as for the L scores of Volubility. Statistically significant *F* ratios were found only in Comparisons 3 and 4, *F*s 24.54 and 20.89, respectively, significant at .01 level. Intelligibility, then, appeared to be dependent primarily on the use of hearing aids.

Complexity. With regard to the complexity of speech, as estimated by the number of sentences used, Table 3 shows that the wearing of hearing aids appears to stimulate language development. Comparison 1 shows the E group as superior to the C group in this respect; but when E children are compared with C subjects also wearing aids, Comparison 2, no significant difference is found. There is also much greater variance among the children who had hearing aids. (*F*s for Comparisons 3, 4, 5 were significant at or beyond .01 level.)

Quality. All the differences found in intonation, phrasing, fluency, and rhythm in the analyses of speech quality were in favor of the E group, although none reached statistical significance and hence are not reported here. In this connection it should be recalled that the E group was a year younger than the C group.

The analysis of the data from the Miniature Life Toys situation also gave some evidence of the superiority of the E group in speech production. Category (c), Verbalization during the Play Session, shows that verbalization was present in 11 of the 12 children in the E group, in six of the 15 of the C group. Chi square with Yates correction for this difference was 5.6, significant beyond the .02 level.

Speech Perception. In the Oral Instruction Test the E group gave a slightly better performance on this of speech reading skills than the C group, but the difference was not statistically significant and the data are not presented. It should be mentioned again, however, that the E group was the younger group, with one year less of schooling.

Reading Achievement. Quantity. Table 4 shows significant differences in number of books read for Comparisons 1, 2, 3, and 5 in favor of the E group and of those wearing hearing aids. Differences in variance, with *F*s significant at or beyond the .01 level, were also found in these comparisons. For Comparison 4, when children in

TABLE 5. Comparison of upper and lower thirds of E and C groups in achievement in speech production and reading.

Child	Volubility				Speech Complexity		Speech Quality	Reading Achievement		
	E-O Scores		I. Scores		Number of Sentences		Rating*	Quantity		Quality
	Score	Rank	Score	Rank	Score	Rank		Score	Rank	Rating†
E Group—Upper Third										
KA	373	1	207	1	67	2	1	18	2	5
RB	363	2	195	2	83	1	2	9	4	4
PC	323	3	79	3	59	3	1	19	1	5
HB	233	4	67	4	42	4	2	14	3	4
E Group—Lower Third										
NE	51	9	9	9	1	10.5	5	1	12.5	1
CS	43	10	6	10	4	9	5	1	12.5	2
EB	19	11	4	11	1	10.5	5	1	12.5	2
LC	7	12	0	12	0	12	5	1	12.5	2
C Group—Upper Third										
DA	246	1	66	2	60	1	2	3	2	3
AN	185	2	92	1	32	3	1	3	2	2
TR	166	3	36	3	34	2	5	2	9	3
AE	119	4	23	5	20	4	2	3	2	2
MS	95	5	no tape		6	7	4	2	9	2
C Group—Lower Third										
BJ	45	11	9	11.5	1	9	3	2	9	3
SF	43	12	10	9.5	0	12.5	5	2	9	2
ML	33	13	16	7	0	12.5	5	2	9	2
AB	23	14	2	14	0	12.5	5	1	15	2
EL	22	15	3	13	0	12.5	4	2	9	3

* Ratings: 1-Normal, 2-Good, 3-Fair, 4-Poor, 5-Bad.
† Rating scale: 1 (low) to 5 (high).

group C wearing hearing aids were compared with those not wearing them, both the mean difference and the difference in variance are negligible, suggesting that in the area of reading the influence of hearing aids as such is limited.

Quality. In level of reading difficulty statistically significant differences were found in Comparisons 1, 2, and 5 in favor of the E group and again a significantly greater variance is found for the E group in Comparison 1. Here, then, teaching methods appear to be of greater importance than the wearing of hearing aids.

It is interesting to observe that every difference for which advance prediction was made was in the expected direction, even though not always reaching statistical significance. There is so slight a probability of this occurring by chance that the probability level does not appear in the table consulted (*13*, pp. 430-431, 458). Of the 25 predictions made, all differences were in the expected direction and of these, 19 were statistically significant.

Comparison of Upper and Lower Thirds in the E and C Groups. In order to highlight the nature of the individual

TABLE 6. Comparison of upper and lower thirds of E and C groups in hearing loss and mental test scores.

	Hearing Loss		*Mental Tests*			
			Pintner		*Goodenough*	
Child	*Decibels*	*Rank*	*IQ*	*Rank*	*IQ*	*Rank*
E Group—Upper Third						
KA	83	4	123	7	106	9
RB	78	2	122	8	117	4.5
PC	100	10.5	126	6	123	2
HB	67	1	135	3	117	4.5
E Group—Lower Third						
NE	90	6			88	12
CS	96	8	109	10	115	6
EB	100	10.5	136	2	143	1
LC	85	5			103	10
C Group—Upper Third						
DA	110	15	125	4.5	119	2.5
AN	75	1.5	119	7	119	2.5
TR	90	5.5	134	3	104	8
AE	95	7.5	104	12	113	6
MS	75	1.5	113	8		
C Group—Lower Third						
BJ	97	10.3	109	9	118	4
SF	96	9	99	14.5	85	13
ML	90	5.5	99	14.5	73	14
AB	103	14	125	4.5	129	1
EL	97	10.3	137	2	110	7

performances underlying the differences found between the E and C groups in mean performance and in variance, the data for subjects in the upper and lower thirds in achievement on these measures are presented for both the E and C groups in Table 5. This was done by taking the highest and lowest scorers for Volubility, E-O scores, and presenting their other scores and ratings. As Table 5 clearly shows, with no exceptions in group E and few in group C, the same children ranked high or low for each measure of speech and language. Table 6 gives the raw scores and ranks for degree of hearing loss and mental tests, the Pintner Non-Verbal and the Goodenough Draw-a-Man tests. Here, obviously, the children with the most hearing or highest ranks on the mental tests are not necessarily the ones who scored highest in speech and language achievement.

Personality Development. As noted previously, the qualitative evidence afforded by the many observers of varied backgrounds was unanimous in finding the E group better balanced in personality development. With regard to the attempt to obtain more objective evidence of personality gains during the Evaluation Year, the result is less striking, possibly because the measures used were too coarse. First, the data from the Miniature Life Toys sessions revealed that in neither group was there the sort of elaborated dramatic

play commonly found with hearing children of these ages. However, at a simple level of elaboration there was more action ascribed to the doll figures by the E group. Ten of the E group and only two of the C group were rated as showing 'moderate action' in play, three of the E and 13 of the C group showing 'little or no action.' Chi square with Yates correction for these differences was 10.54, significant beyond the .01 level.

In all the measures used with the World Test the E group occupied a middle position somewhere between the extremes represented by the C group and the hearing control group studied. However, statistically significant differences were found only between the C and the hearing groups. Thus, there was a consistent but statistically nonsignificant tendency on all measures for the E group to appear as less rigid than the C group and to show fewer Buhler signs of disturbance.

Discussion

The initial purpose of this 'new' approach to preschool education for the deaf was to liberate young deaf children from the deadening effects of a prematurely formal kind of teaching in the hope that they would develop personalities less marked by rigidity, immaturity, and overdocility—characteristics reported in studies of adolescent and adult deaf as well as in studies of deaf children. Evidence of the present study in this area is largely qualitative, but consistent. Numerous observers of varying backgrounds and interests were in unanimous agreement in their 1948-1952 records that children in the E group were markedly freer, less rigid, and more interested in activities, in each other, and in visitors than the children in the C group. (It may be noted that these observed differences were hardly due to a 'Hawthorne effect'—improvement because of sheer lavished attention—because the C group was being observed and followed as closely as the E.) In addition, portions of the analysis of behavior from the MLT and World Test data added a bit of quantitative verification of these universal impressions and showed that the E group was, in general, somewhat more like the groups of hearing children studied than was the C group.

As already noted, in the eyes of the administrators of the school the quality of activity and behavior of the E group was so obviously superior that the program was adopted for all succeeding groups at the end of the E group's first preschool year. It should be emphasized here that those involved in this program were convinced that all teachers who work with preschool deaf children not only should be trained teachers of the deaf but also should have nursery school training and experience, preferably with hearing children. Moreover, it is the conviction of the authors that full-scale, consistent introduction of such liberalized teaching methods and a much more complete and early introduction of hearing aids than was possible in this pilot program would have resulted in far more spectacular benefits than those reported here. They would also hypothesize that further benefits would have accrued from continuing a similar educational approach beyond the preschool years. Such an approach should stress experiences involving the child's own interests in a program characterized as that of

the 'liberal school' (*5, 12,* chap. 9).

Such a liberation of personality development was the primary goal, but at the outset of this study there was considerable fear among some of the school's personnel that the E group children might suffer in acquisition of speech, language, and academic skills. One purpose of the Evaluation Year study was to demonstrate as clearly as possible that such fears were groundless; it was hoped that evidence could be obtained to show that the E group children were no worse off in these respects than the C group. Instead, as has been shown, it was found that the E group was dramatically superior in precisely those areas of language development where greatest fear of retardation had been expressed, even though most of the comparisons were made with the C group having the advantage of a year of development and of school experience. Observations revealed that the E children showed more enthusiasm for learning speech and more ability to use it in out-of-class situations. In test situations, even though these were somewhat weighted, perhaps, in their formal quality in favor of the C group, the E group was clearly more voluble, showed more use of complete sentences, and was better understood by the face-to-face observers and from recorded speech. In so far as the effects of the two variables, use of hearing aids and enriched school experience, could be differentiated, the impact of the hearing aids seemed somewhat more important for speech; but the effect appeared to be synergistic and the hearing aids were of greatest value in the context of the liberalized teaching atmosphere. Because of limitations of the data (only one child in group E without a hearing aid) it was not possible to see how the new teaching method worked without the use of hearing aids. It can be concluded only that the new teaching methods were effective in the presence of hearing aids. In practical terms it seems essential to combine the two approaches.

As in the area of speech learning, in academic achievement not only was the fear of retardation proved baseless, but sharp differences in favor of the E group were demonstrated. Here the analysis showed the somewhat greater importance of the teaching atmosphere over the use of hearing aids. The only available measures of academic achievement were the measures of quantity and quality of reading accomplishment, but from teachers' reports one gains the strong impression that conclusions about these differences could be generalized over a wider area of academic activity.

It should be noted that analysis of all the data of the Evaluation Year revealed not only differences in group means but also markedly greater variance of performance in the E group. The effect of the experimental variables in the E group appears always to have been one of 'taking off the ceiling' on achievement and perhaps on development as well. (See Table 5.) There is regularly much greater uniformity of measures for the C group, i.e., the C children tend to be more similar in performance with fewer extremes of outstanding achievement. In the E group every measure reveals several individuals who far exceed the mean, particularly in those measures which permit wide dispersion. Such an effect is strikingly missing in the C group.

The effect of the experimental program appears primarily as liberating a number of individuals to proceed at their own rate of ability. Examination of the records of the E children who achieved most in the program and of those who achieved least revealed that these tended to be the same individuals in all aspects of learning tested. This was also more or less true of the C group, but here the differences were markedly less between high and low achievers.

It should also be stated that the experimental program did not succeed equally with all the children. For some it worked wonders, for others, not. One can only speculate on the limiting conditions that prevented some children from benefiting more from the program. Further research would be needed to investigate these conditions. Perhaps some children had more easily usable residual hearing; others may well have had added handicaps of an aphasic or emotional nature or of central deafness that would have made learning difficult in any situation. In any case, there seems no reason to believe that the nonachievers were worse off than they might have been under the old program.

Examination of the observational data and teacher reports filed for these children in the E group suggests some of the possible reasons for high or low achievement. The lowest achiever, for instance, was a child described as showing extreme nervous tension and anxiety, at home and in school, and having a difficult home situation. Another child in the lower third was seen as lacking security and initiative, under great pressure from home, with stealing a problem. A third showed insecurity and great need for reassurance and was described as an unstable boy, quiet and apprehensive, thin, wizened, looking perpetually troubled, from a difficult home where his parents made no effort to talk to him. A high achiever, on the other hand, was called friendly and happy, eager to learn, well cared for by a most cooperative mother; another boy, bouncy and exuberant, too anxious for approval but showing great energy and vitality; a third high achiever, a big, slow-moving girl, free and spontaneous with adults, gay and happy most of the time.

For the majority of the children in the E group, for whom the program was successful, the most distinctive characteristic was that *they learned to love to talk*. It appeared that what may be regarded as a *learned* dread of the deaf child to express himself orally can be overcome. The authors believe that this was accomplished mainly by transforming the classroom into a pleasant, edifying place, where failure, impotence, and embarrassment were reduced by the teachers' methods, to be ultimately banished by growing successes in intelligible speech and by the constant stimulation of rich experience with a maximum of accompanying sound from the wearable hearing aid.

In the C group, on the other hand, the more formalized teaching procedures tended to reduce the learning of speech from a veritable triumphant conquest to a routine procedure in which failure was emphasized and avoidance fostered. The learning of speech in the formal class situation would appear to go the way of the three Rs in all too many overformalized schools for hearing children—something

to be learned in the classroom, if at all, and to be left there. In other terms, the liberated atmosphere of the E group's classrooms encouraged the *transfer* of speech learning and of the use of residual hearing to new situations while the traditional atmosphere fostered their avoidance in any but the classroom situation.

Summary

The effects of a liberalized and enriched preschool program for deaf children were studied in an experimental group of 12 and a control group of 15 children who preceded the experimental group by one year in school. The experimental group program emphasized (a) nursery school procedures modeled on the best practices with hearing children, with speech and language teaching in the context of natural play, and (b) early use of individual hearing aids. The control group was taught by the more formal procedures characteristic of preschool classes before inauguration of the new program. Various measures of speech production and perception, academic progress, and personality growth were used to evaluate the achievements of both groups. Most of the measures reported were made when the E group was in second grade.

In all measures the experimental group proved superior in performance to the control group, although (except for academic measures) a year younger and with one less year of schooling than the control group. The consistent use of individual hearing aids appeared to be an important factor in producing superior achievement in speech. Analysis of the data suggests, however, interdependence between teaching method and the wearing of hearing aids. In academic achievement as estimated by quantity and quality of books read in third grade, liberalized teaching methods appeared especially important. Evidence of observational data, as well as of more objective data from play studies, showed the children in the experimental group achieving happier school adjustment, in general, and more healthy personality development than children in the control group.

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Audiometric Procedures Used with Children

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A variety of audiometric techniques has been employed in an effort to make accurate assessments of the hearing of young children. Some of these techniques have come to be widely accepted as part of the testing routine when conventional audiometry is not effective. It was the purpose of this investigation to evaluate several audiometric procedures in order to determine their effectiveness in obtaining the pure-tone audiometric thresholds of young children.

Equipment and Procedure

The children's testing unit employed in this investigation included a Beltone Model 10-A audiometer, a Grason-Stadler Model E664 psychogalvanometer, a Haug Pediacoumeter, and a Graflex Constellation automatic slide projector with a foot-operated switch and a rear-projection display screen. Toys, noisemakers, and other devices were used to gain the child's attention and to motivate him during the test. This equipment was contained in a shelved console-like testing table designed to facilitate rapid shifting from one testing technique to another.

The testing table is enclosed on one side (Figure 1) so that the child, though he faced the table, could not see the testing equipment. The earphones, GSR electrodes, and Pediacoumeter response button extended from the enclosed side of the testing unit to a small table at which the child was seated. Also on the enclosed side of the table facing the child were visual display units for use in play audiometry. The visual display for the Haug Pediacoumeter and the rear-projection slide display screen also faced the child from the enclosed side of the table. The slide projector and screen were simply a modification of the peep-show device described by Dix and Hallpike (*1*). Instead of presenting pictures inside a box as with the Dix and Hallpike peep-show, colored slides were projected on a screen. The Pediacoumeter is similar in principle to the peep-show. The basic difference is that instead of being rewarded for response to sound by a 'peep-show,' the child may see any one of seven jack-in-the-box figures emerge from the testing apparatus. The Pediacoumeter has been described in detail by Guilford and Haug (*2*).

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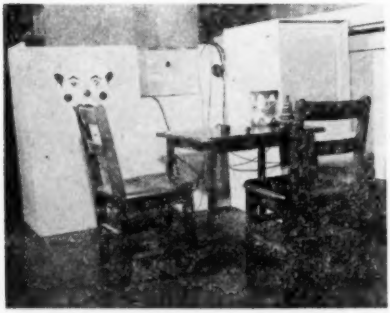

FIGURE 1. Display side of testing table.

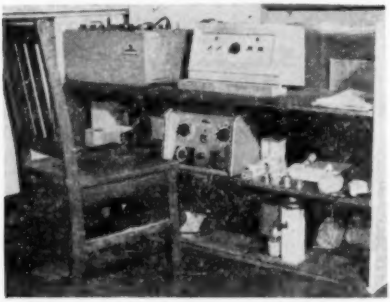

FIGURE 2. Control side of testing table.

The testing equipment and controls were out of sight of the child and faced the audiometrist as shown in Figure 2. The GSR unit and the Pedi-acoumeter were on the top shelf, and the slide projector and the audiometer were on the middle shelf of the test console. These units were within easy reach of the audiometrist, who could, if necessary, operate them simultaneously.

In the usual testing situation two examiners worked together to obtain thresholds. In many situations, however, it was possible for one person to manage both the equipment and the child at the same time. When tests were administered by two examiners, one of them, usually the more experienced, worked directly with the child. It was the responsibility of this person to establish rapport with the child, select testing techniques, maintain a game-like atmosphere during the examination period, and interpret the child's responses. The primary task of the other tester was operating the testing equipment. This person was seated at the control side of the testing table where he faced the child while presenting pure-tone stimuli.

When a child was referred for testing, his behavior was first observed during semistructured play activities with the examiners. The term 'semi-structured' is used here to indicate that the child had considerable freedom to choose and follow the type of play activity he desired. His choice of activity was limited, however, by the types of playthings available. The toys consisted mostly of noisemakers, blocks, etc., which could be used by the testers to shape the child's activity into a pattern similar to that expected during the actual testing. This pretest play period served a four-fold purpose: (a) Play enabled the examiners to establish rapport with the child. One well-known problem in audiometry with young children is that they are often fearful when confronted with strange surroundings and testing apparatus. Usually, however, once the child no longer feels threatened by the testing situation, he will cooperate to the limit of his mental ability and attention span. It was found that this cooperation from the child was best achieved through a gradual transition from play to play-audiometry. (b) The child's reactions to gross sounds were observed. The examiner was able to get some idea of

the intensity of sound necessary to elicit a response from the child. (c) The play period developed in the child, insofar as possible, an awareness of sound and its relation with the testing activities to follow. The child discovered that in this situation sound 'did' something. He learned to associate sound with some observable occurrence which followed it. If this association was achieved, conditioning usually proceded rapidly when threshold testing was begun. (d) The activity helped the examiners to select a testing procedure which they believed would be effective in testing the child. For the most part, the testing procedure was actually determined by the child rather than the testers. In other words, the testing procedure was usually an extension of the play activity chosen by the child. Other factors such as alertness, attention span, lack of fear, and medical and psychological case history material were also considered in the selection of an audiometric technique. By far the most important consideration, however, was the appeal that a particular activity had for the child being tested.

If it appeared that there would be no serious problems encountered in obtaining thresholds from the child, the play period was quickly terminated. In some instances testing began in less than a minute. When the child was fearful or slow to understand, more time was spent in play before the actual test. In most cases it was not found profitable to extend the play period beyond 10 or 15 minutes.

Pretest play activities consisted of games in which the child made simple responses to auditory and visual stimuli. Such noisemakers as squeeze toys, clackers, bells, and drums were used to provide auditory stimuli. Visual stimuli were provided by such things as colored lights, dolls, and movements and pantomime by the clinician.

One activity was centered around a painted clown face mounted on the front of the test console. The mouth of the clown contained a microphone and the nose and eyes were painted light bulbs. When the sound pressure level at the microphone became sufficiently intense, a switch was automatically closed thereby lighting the eyes and nose of the clown. Usually, if the child had enough residual hearing to detect the sound, he quickly became aware of the association between the sound and the lights. The child was then allowed to manipulate the noisemakers to light the eyes and nose of the clown.

Other activities included training the child to perform certain tasks in response to auditory or visual stimuli. For example, some children were taught to pile blocks whenever they heard (or saw) the examiner strike a drum or ring a bell. Other children were taught to turn around to localize a sound behind them. These and similar activities formed the core of the pretest play period, and gradual transition was made from these activities to the actual testing procedure.

A distinguishing feature of the testing unit was the flexibility it provided in the selection of a great many audiometric techniques. From these techniques the one thought best suited for a particular child could be selected. The basic techniques used have already been described in the discussion of the testing equipment. There were many modifications and combinations of these testing techniques, however, and no

TABLE 1. Subjects tested, grouping of subjects, and degree of hearing loss of subjects in Group II distributed according to age in months.

Age in Months	*Subjects Tested*	*Group I*	*Group II*	*Hearing Loss of Subjects in Group II (Ears)*		
				Mild	*Moderate*	*Severe*
100-105	1	0	1	2		
94-99	2	0	2	1		
88-93	3	0	3			2
82-87	3	1	2		2	
76-81	5	0	5			2
70-75	9	2	7	2		
64-69	6	1	5			
58-63	10	0	10	2		
52-57	8	1	7	3	1	2
46-51	4	1	3			
40-45	4	1	3		2	
34-39	2	1	1		2	
28-33	1	1				
Total	58	9	49	10	7	6
Percentage		16	84			

definite set of rules was followed when the children were being tested. The guiding thought in selecting and carrying out a technique was that the various parts of the testing unit could be used separately or together, and the examiner could freely select any technique or combination of techniques that he felt might be effective in the testing of the child.

SUBJECTS AND RESULTS

The subjects tested in this investigation were selected from a population of children entering the Speech and Hearing Clinic of Ohio State University for speech and/or hearing evaluation. All children entering the clinic from January to June 1959 served as subjects with the restriction that they be 100 months of age or less. Fifty-eight children within the age range were admitted for evaluation during this period. The frequency distribution in Table 1 indicates that these subjects were approximately normally distributed with respect to age. The median age calculated from the grouped data on Table 1 was 64 months. The mean was 65.5 months. Fifty per cent of the children fell within a year of the median age.

After the testing was completed, each child was classified in one of two groups as determined by responses during the test. Children who exhibited one or more of the following behavioral signs were classified as Group I: (a) response not consistent within a range of 15 db on each of the frequencies tested for both ears; (b) startle responses and localization attempts to gross-sound stimuli but no response in a structured situation using earphones: (c) intolerance to earphones making it necessary to use

binaural tests administered in the sound field. The remaining children were classified as Group II. For children in Group II, responses were generally more consistent, and earphones could be used in the testing, making it possible to obtain both air- and bone-conduction audiograms for each ear.

Table 1 shows that out of 58 children tested 84 per cent could be classified as Group II subjects. Of the 29 children falling below the median age, 83 per cent were in Group II. For the 29 children above the median age, 86 per cent were classified as Group II subjects. A positive biserial correlation of .35 was found between the chronological age of the children tested and classification into Group I or Group II. The correlation was significantly greater than zero at the .04 level of confidence. Of the 98 ears (49 children) in Group II, 23 ears were found to have defective hearing. These ears were further classified in terms of degree of loss. Ten ears were classified as having mild losses; seven, moderate losses; and six, severe losses. Six of the 49 children in Group II had hearing losses that were severe enough to result in recommendations for hearing therapy. It was felt that two of the nine children in Group I would also profit from hearing therapy. Earphones could not be used in testing these two children, but their responses to stimuli in sound field were consistent and indicated the presence of moderate to severe hearing losses.

Four of the nine children in Group I showed definite indications of peripheral hearing loss. The diagnosis was based partially on medical and psychological case histories, but the strongest evidence favoring peripheral loss was the responses of these children to stimuli in the sound field. Two other children in Group I had medical histories suggesting brain damage. Their behavior during testing was also typical of brain-damaged children. Localization and startle responses of these children to calibrated stimuli in sound-field testing indicated the presence of hearing at 20 db re normal threshold. Another child appeared to be emotionally disturbed. Thresholds of 15 db were obtained in one ear for frequencies of 1000 to 4000 cps inclusive before he removed the earphones and refused to cooperate with the examiners. The remaining two children listed in Group I had psychological case histories suggesting mental retardation. Both children responded to gross sounds but could not be conditioned to respond to pure tones presented monaurally.

Occasionally it seemed that the very young children responded best when the testing methods were simple and direct. The usual methods employed with the peep-show or the Pediacoumeter sometimes had to be modified for these children. In some cases they had difficulty learning to associate the jack-in-the-box figures or the picture on the screen with the tones being presented. Also, some of the very youngest children did not appear to have the finger coordination needed to push the response button for the peep-show or the Pediacoumeter. Most of the children were tested, however, by conditioning them to strike a drum, ring a bell, pile blocks, etc., when a tone was presented. Sometimes it was necessary to present a conditioning light simultaneously with the tone. After the child was conditioned to

respond to the light, it was no longer used and the child's response generalized to the tone. Children above the age of four years were tested most easily by using the generally recommended procedures with the Pediacoumeter and the peep-show. These devices, though slightly more complicated, were successful in gaining and holding the attention of most children. Many of the older children were tested or could have been tested by the hand-raising techniques of conventional audiometry, but it was found that they were not as fearful and became more enthusiastic and cooperative when play audiometry was used.

Usually a play activity that was observed to be effective in holding the child's interest became the central activity of the audiometric test. Because of this, some type of play audiometry was always selected during the pretest play period. The only exception was in the case of two of the oldest children. For them it was obvious that conventional audiometry would be effective, and it was used without resorting to any of the other techniques available. Electrodermal audiometry was used with all children who had been classified as Group I after play audiometry had been attempted. None of the children in this sample who had been classified as Group I after play audiometry were reclassified as Group II subjects on the basis of the results of electrodermal audiometry.

Summary

Fifty-eight children with a mean age of 65.05 months were administered a variety of audiometric techniques, including electrodermal audiometry and several forms of play audiometry. They were classified in Group I, children not easily tested, or Group II, children for whom test results were relatively conclusive in that both air- and bone-conduction audiograms could be obtained. Group II included 86 per cent of the children above the median age and 84 per cent below the median age. A low positive correlation was found between age and group classification. In Group II 23 ears were found to have some hearing loss and six children were found to have hearing losses of such a degree that therapy was recommended. Four children in Group I showed definite indications of peripheral loss, but the nature of the loss could not be precisely determined. The remaining five children in Group I made consistent responses to gross sounds but could not be conditioned to respond to pure tones presented by earphones in a structured situation. Each of these five children showed definite indications of brain damage, emotional disturbance, or mental retardation. With younger children, less complicated and more direct techniques sometimes seemed most effective. In no case was electrodermal audiometry found to be successful when play audiometry had been unsuccessful.

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The Development of Stuttering: III. Theoretical and Clinical Implications

• *Oliver Bloodstein*

This is the last of three articles on the course of development of stuttering based on a study of the clinical records of 418 stutterers from two to 16 years of age. The first (*2*) dealt with the changes which take place in various individual features of stuttering, and the second (*3*) described four major phases in the development of the disorder. The present article is concerned with certain broad implications and clinical applications of the data which were presented in articles I and II.

Primary and Secondary Stuttering

Among the most fundamental of these implications are those which have to do with the familiar concept of primary and secondary stages in the development of stuttering. When it was advanced by Bluemel (*5*) in 1932, this was one of the earliest concepts to give formal recognition to the fact that stuttering is a disorder which undergoes a course of development, and certainly the first to gain wide currency.[1] Gradually, however, as experience with young stutterers accumulated the belief grew that the concept was in need of some refinement. In 1942 Johnson (*12*) pointed out that it was difficult to distinguish primary stuttering from normal nonfluency. In 1953 Glasner and Vermilyea (*9*) demonstrated that in spite of the popularity of the term 'primary stuttering,' there was a certain amount of confusion among speech clinicians about what it meant. In 1954 Van Riper (*13*), whose adoption of the concept had done much to gain acceptance for it, introduced the term 'transitional stuttering' in apparent recognition of the fact that some stutterers could not readily be classified as either 'primary' or 'secondary.' In 1957 Bluemel (*6*) revised his definition of primary stuttering to include 'spasm' or 'blocking' and emphasized that in the secondary stage the primary symptoms are not replaced, but added to –changes which make a considerable difference, as will be seen shortly.

The results of the present study provide still further reasons for dissatisfaction with the concept. Before these are enumerated, however, it is necessary to point out that there is a particular sense of the expression 'primary and secondary stuttering' to which there can be hardly any objection at all. These terms are sometimes used to refer, not to different stages in

[1]Prototypes of this concept are to be found in writings by Bluemel (*7*) and Froeschels (*8*), which go back to 1913 and 1921, respectively.

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the development of stuttering, but to two types of symptoms, those which may be regarded as integral features of the stuttering and those which are associated or overlaid. In this sense, the primary symptoms include the repetitions, prolongations, and hard contacts which are evident in every phase of development of stuttering. The secondary symptoms are the postponements, starters, and release devices, or other concomitants such as perspiration, flushing, or pallor. To say that there are primary and secondary *aspects* of stuttering to be observed in a given case is to employ these terms usefully and aptly. To say that there are primary and secondary *stutterers* is to make quite a different kind of statement, and one which seems to rest somewhat precariously on its assumptions.

The question may be divided roughly into three aspects, primary stuttering, secondary stuttering, and the relationship between them. The assumption underlying the term 'primary stuttering' as it appears to be most frequently used is that there is an initial stage of stuttering during which the child repeats or prolongs sounds simply, effortlessly, and without awareness, as distinct from a second stage during which stuttering is marked by struggle, associated symptoms, fear, and embarrassment. The observations of this study appear to indicate that it would be extremely difficult to find a child who accurately fits this definition of a primary stutterer. In the first place, there is evidence that total lack of awareness of speech interruption probably does not exist, even in the youngest children brought to the clinic as stutterers. It would be more accurate to say that the majority of young stutterers do not react emotionally to their speech difficulties most of the time. But this is also true of a great many older children who have tense and complicated stuttering patterns. Furthermore, the description 'simple' or 'effortless' involves difficulties of its own. It is true that many young stutterers do an unusual amount of essentially frank repeating of words and syllables, both with and without other symptoms, and both before and after episodes of more complex stuttering. On the basis of clinical observation of a fairly large sample of such children it appears to this writer exceedingly doubtful whether these repetitions are ever totally lacking in some evidences of strain by the time they begin to occur often enough to seem somewhat different from the normal hesitations which they resemble. These evidences may consist of slight breathing abnormalities, mild glottal or articulatory tensions, increased loudness, hurry, or over-all reduction in the child's spontaneous behavior. In a word, it is difficult to distinguish these symptoms qualitatively from the struggle reactions of advanced stuttering. In addition, it is not certain that the earliest symptoms to be regarded as stuttering are always repetitions at all. It is known that a large majority of parents testify that they are. This study, however, did not yield support for the view that this is so in every case. Forgetting theory for the moment, and considering the number of children as young as two and three who are observed to have 'tonic' struggle reactions in the clinic, as well as those cases in which these are reported as the initial symptoms of stuttering, it is a moot point which belief is based to a greater extent on pure as-

sumption, the belief that stuttering can only begin as repetition or the hypothesis that it may sometimes begin in other ways as well.

Even if it were assumed that such a thing as 'primary' stuttering exists, 'secondary' stuttering is a concept with difficulties of its own. If secondary stuttering refers to all stuttering other than simple, unconscious repetition or prolongation, then it appears to have so many possible meanings as to have almost no useful meaning at all. As has been seen, stuttering takes various more or less distinctive forms as it develops. Tension and awareness are common to all of them in some measure; yet each phase is quite different from the last. Four stutterers at four different stages of the disorder may exhibit essentially the same hard contacts and elaborate release devices; but from the point of view of the conditions under which the difficulty increases, the length and frequency of fluent periods, the range of fears, the kinds of attitudes, avoidances, and other associated behavior, the type of treatment called for, and the outlook for recovery, they will tend to present vastly different problems.

The most basic part of the theory of primary and secondary stuttering has not yet been touched on, however. This is the hypothesis that all of the blockages, forcing, and other struggle behavior of stuttering arise as the child learns to fear simple repetitions and prolongations and struggles to avoid them. This is the essence of the concept, and a more powerful and appealing assumption in the field of speech disorders would be difficult to find. It is hardly any wonder that it so promptly gained wide acceptance. Yet it is precisely this assumption which is in sharpest conflict with the observations of this study. If there is a single finding of this study which stands out in significance from the rest, it is that the consistency effect extends to the repetitions and prolongations of young children in the earliest phase of stuttering. The clear implication of this fact is that even the most rudimentary symptoms of stuttering are anticipatory struggle reactions. If this is so, it does not lend support to any theory of the development of stuttering which draws a sharp distinction between 'simple' repetitions or prolongations on one hand and blockages on the other hand, and regards the one as a reaction to the other. It would seem more accurate to regard the development of stuttering as a process in which anticipatory struggle reactions may become steadily intensified. It is probable that at every stage of development the symptoms ordinarily referred to as stuttering consist of somewhat different aspects of struggle behavior, some more violent than others, but all reflecting at least a subliminal anticipation on the part of the child of speech failure.

The view that relatively simple repetitions are not to be differentiated sharply from other forms of stuttering behavior accords well with a number of other observations, some of which have already been alluded to: (a) It accords with the observation that evidences of tension are to be found in conjunction with even the simplest repetitions. (b) It is in accord with the finding that the initial symptoms of stuttering may possibly be hard contacts or forcings in some cases. Only a theory which draws no fine line between repetition and forcing can account for such a tendency to begin sometimes as one and

sometimes as the other. (c) It is consistent with the fact that the same conditions under which any of the struggle reactions of advanced stuttering disappear are equally effective in eliminating the repetitions of young stutterers. These conditions include suggestion, distraction, and anything else which serves to dispel the expectation of stuttering. (d) It is consistent with reports of onset of stuttering in which repetitions virtually proclaimed themselves as anticipatory struggle reactions by reason of the fact that they appeared to result directly from the child's reaction to his infantile errors of language or articulation or to other kinds of speech failure (*4*).

In summary, two distinct stages of the kind ordinarily referred to as primary and secondary stuttering do not, strictly speaking, appear to exist. In practical terms, a clinical decision which depended upon whether a child belonged in one or the other category would appear to be rather hazardous as well as very difficult to make. To call a child a primary stutterer is to make certain assumptions about him which are questionable and probably misleading. To say that he is a secondary stutterer is to reveal so little about the extent to which his difficulty has advanced that almost no clue is offered as to how to treat him. The concept of primary and secondary stuttering has, it is true, served a number of extremely useful purposes which should not be lost sight of. It has directed attention to the fact that there is such a thing in stuttering as a process of development. It has served to show that much of the abnormality of stuttering often consists of devices for concealing it. It has helped to maintain an important place in modern thinking for the concept of stuttering as an anticipatory struggle reaction. Its sharp differentiation between forcings and simpler interruptions undoubtedly influenced the development of Johnson's diagnosogenic theory and so indirectly helped to foster an appreciation of the parents' role and the significance of perceptual and evaluative factors in the onset of stuttering. It is, in short, a concept which has served with distinction, and if it no longer seems to provide an accurate description of the development of stuttering it should be discharged with honor. It may be interjected that practically any theory is an abstraction which fits the facts with varying degrees of accuracy. Primary and secondary stuttering, however, are fictions which appear to grow increasingly less convenient as more becomes known about the disorder.

A good deal has been said here about allegedly 'simple' repetitions and their affinity to developed stuttering. It may help to avoid confusion to emphasize that to the extent that these conclusions are based on actual observation they apply only to the repetitions of children seen in the speech clinic some time after the parents' diagnosis of stuttering was first made. Consequently, it must be added that none of the observations cited bear in a direct way on the validity of a 'diagnosogenic' interpretation of stuttering. That is, it is impossible to say whether the nonfluencies which the parents observed at the very moment when they first regarded these children as stutterers would have exhibited the consistency effect, the traces of tension and awareness, or any other evidences of anticipatory struggle. The only inferences

which can be drawn with regard to this question are based on the reports and descriptions of parents. Such descriptions are exceedingly difficult to interpret. When the mother states that the child forced and struggled 'from the start,' it is difficult to be certain that she has not merely forgotten her earlier concern about much simpler hesitations. On the other hand, when she reports that he began by merely 'repeating his words,' it is extremely difficult to distinguish the nonfluencies which she describes from the 'simple' repetitions which exhibit the consistency effect when they are observed in the speech clinic. It should be remarked that such terms as 'simple,' 'easy,' 'force,' 'tension,' and the like appear to have such a latitude of meaning when parents apply them to repetitions actually observed during the clinical interview that one sometimes despairs of gaining very much accurate knowledge from words of this kind about the repetitions which parents regarded as the initial symptoms of stuttering. Perhaps it may be said that there is hardly a problem in which the specialist in the scientific study of speech disorders is as hampered by the limitations of the normal communicative process. These questions will be approached again from a somewhat different standpoint in discussing the relationship between stuttering and normal nonfluency.

Tension and Fragmentation

The implications of the consistency effect in the repetitions of young stutterers tend to raise an additional question. It is easy enough to regard a hard contact or labored prolongation as a struggle reaction. But is it reasonable to conceive of repetition in this manner? Perhaps a good reason for doing so may be offered. When the stutterer repeats the first sound of 'boy,' his tendency is to say [bə-bə-bəɪ] rather than, more logically, [bɔ-bɔ-bɔɪ] or [bɔɪ-bɔɪ-bɔɪ]. During a recent conference on stuttering,[2] the psychiatrist James G. Miller was asked for his opinion of the reason for this curious fact. Dr. Miller offered the suggestion that when the whole word seems too difficult to say the stutterer may feel able to attempt a part of it.[3] If this simple and exceedingly interesting explanation is pondered for a moment, it will be found to provide a cogent reason for the fact that the stutterer repeats at all, as well as for a good deal more that is observed in his speech behavior.

It may probably be said of almost any action which one has learned to perform that if it is approached with the conviction that it will demand all one's ability, or more, and that it is extremely important to succeed, two things are particularly likely to happen: (a) the action is likely to be begun with more muscular tension than is necessary and (b) there may be a tendency to perform the action in fragments, that is, to do part of it because the whole thing appears too difficult. It is just such reactions of tension and fragmentation which the symptoms

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[2]Conference on Stuttering Therapy sponsored by the Speech Foundation of America at Delray Beach, Florida, December 28, 1956, to January 3, 1957.

[3]An interpretation of speech repetitions along somewhat similar lines has recently been offered by Johnson (*10*, p. 256).

of stuttering appear to represent.[4] The tension aspect of the disorder is obvious and does not need to be lingered over. Fragmentation in speech takes a number of different forms. It consists basically of the separation of a small portion of speech or articulation from the rest. The arch type of stuttering in its fragmentation aspect is the common tendency to say 'run-running,' a rudimentary form of struggle behavior shared by stuttering children with many whose speech never comes to be regarded as abnormal. It is in repetition that this aspect of stuttering is seen most clearly. The stutterer repeating the first syllable of a word seems to feel incapable of attempting the whole word immediately. He has a certain kinship, remote though it may be, with the golfer rehearsing the beginning of his swing or the dart player rehearsing the beginning of his throw. Fragmentation may also take the form of breaks or pauses, and it is to be noted that very young Phase One stutterers sometimes display apparent postponement reactions such as pausing, or repetition of a neutral vowel, which may probably be regarded as integral symptoms of stuttering rather than as postponement devices in the usual sense. That is, these reactions appear to be based, not on the desire to avoid a consciously anticipated stuttering block, but on the underlying assumption that speech is a difficult task which is sometimes best put off. Fragmentation is even present to some extent in prolongation and hard contact, in which the sound is separated in a sense from the rest of the word, although tension is usually the more conspicuous aspect of these reactions. It must be emphasized that these are not to be regarded as necessarily alternative aspects of stuttering; both are present in some measure in almost every stuttering reaction. One or the other is usually the dominating element, however. It would probably be accurate to say that fragmentation is the milder aspect of the two and, by and large, the earlier to appear.

A number of rather puzzling facts about stuttering may be readily explained in terms of this conception of stuttering symptoms. (a) The spectacle of a person continuing to pronounce a syllable which he has already said perfectly several times is baffling in itself without such a conception. (b) The observation that the integral or primary symptoms of stuttering virtually never seem to occur on the last sound of a word is far less perplexing when considered from this point of view. (c) There is the finding that in young children stuttering so frequently occurs on prepositions, conjunctions, and other minor parts of speech. There is at first sight no satisfactory explanation for this mysterious phenomenon which disappears with the termination of the first phase of stuttering, for the fact that some young stutterers have almost all of their difficulty on the first words of sentences, or for the fact that they so often repeat monosyllabic words. All of these turn out to be closely connected and quite understandable observations when seen in relationship to the phenomenon of fragmentation. The crucial point is simply the unit of expression which is being fragmented.

[4]Clinical observations suggest that tension and fragmentation in speech may stem from a large variety of situations which involve excessive speech pressures or the recurring threat of speech failure (4).

As long as the stutterer formulates his critical doubts and uncertainties in terms of his ability to say words, his tendency will be to repeat the initial sounds of words. Young children, however, apparently tend to anticipate failure in terms of whole phrases or sentences as well as words. It is doubtful whether such fine grammatical distinctions are very meaningful to the average preschool child. Consequently, the young stutterer's tendency is often to fragment the phrase or sentence. The result is the repetition of a whole word. This word is always, of course, at the beginning of a sentence or prepositional phrase. That is, the child tends to say 'in-in-in the barn'—never 'in the barn-barn-barn,' any more than he would repeat the last sound of a word. And the words which he repeats are naturally the kinds of words which begin phrases and sentences, *I*, *he*, *and*, *but*, *so*, *in*, *with*, *like*, and other pronouns, conjunctions, and prepositions. It may be said that when repetitions of this type are no longer common, there has been a transition from a belief in the difficulty of phrases and sentences to a belief in the difficulty of words and sounds.[5]

Relation to Normal Nonfluency

Considerable evidence has been presented to support the view that even the simplest reiterations of the youngest child may be true anticipatory struggle reactions from the point of view of the attitudes and assumptions which underlie them. If this is so, then the problem which at first glance seems to arise is how to distinguish between the repetitions of stuttering and those which are normal for young children to have, since it can hardly be denied that, with all of their similarity to advanced stuttering, some of the symptoms of Phase One also bear striking resemblances to normal nonfluency. On what basis were Phase One repetitions identified as stutterings? The answer is, chiefly on the evidence of the consistency effect which marked them as anticipatory struggle reactions. Would it, then, be correct to say that stutterings exhibit the consistency effect, while normal nonfluencies do not? It would certainly be convenient to be able on the basis of such a simple diagnostic test to say that this child is 'normal' while that child is not. There is, however, one important condition which must first be met. It is necessary to show that the consistency effect is not found in the hesitancies of children who are regarded as normal speakers. This is a question which can be answered by means of research, and suitable studies should certainly be done as soon as possible. In the meantime it would seem to be particularly desirable not to entertain too high hopes that such a differential diagnosis will prove to be possible. If a prediction were to be ventured on the strength of the facts already known and the most serviceable framework of assumptions, it would be necessary to guess that a good many kinds of interruptions in the speech of ordinary, normal young children will be found to show the consistency effect. That is, it seems an extremely plausible assumption that the reason the symptoms of some children referred to the speech clinic do not contrast sharply with the hesitations of many normal youngsters is that antici-

[5] Such 'beliefs' do not occupy a very high level of consciousness in most cases until Phase Three (3).

patory struggle behavior is characteristic to some degree of the speech of almost all young children. It would be rather curious if this were not so. One may be fairly sure that the influences which produce stuttering are present to a small extent in almost every child's environment. Consequently, almost every child can be expected to exhibit mildly and fleetingly the tensions and fragmentations which develop into identifiable episodes of stuttering in a few. It would hardly be profitable to discuss whether or not these reactions of the normal child are stuttering, although stuttering may be a convenient enough name for behavior which differs only in degree from that for which parents usually seek clinical help.[6]

Ever since such a thing as normal nonfluency was recognized, it appears to have been assumed that it was something to be distinguished categorically from 'stuttering.' This has given rise to one of the most taxing problems with which speech clinicians have been beset in recent years–the problem of determining what, precisely, is the difference between the two, and of making a judgment in the speech clinic as to whether a given pattern of speech interruptions in a young child is or is not 'stuttering.' Actually, it appears to be far more natural to assume that there exists only a difference of degree between the normal and abnormal. In all probability, the question of how to differentiate between stuttering and normal nonfluency can never have an absolute answer. The only distinction which one can validly make appears to be a purely relative one between struggle reactions which are mild and occasional and those which are more severe and persistent.

This problem tends to raise the important practical question of what name to give to the relatively mild struggle reactions of a young child in conversing with a parent who has developed a certain degree of alarm about them. It should be considered in this connection that with 'normal' struggle reactions shading gradually into more unusual stuttering behavior, there is probably a substantial borderland of children who may or may not be brought to the speech clinic depending on the temperament or standards of the parents.[7] It is clear that from a strictly

[6] In this connection recent research findings by Johnson and his students (*10*) are of exceptional interest. It was discovered that a considerable number of children who had never been regarded as stutterers were reported by their parents to have exhibited unusual tension or signs of bewilderment, irritation, or concern in conjunction with their nonfluencies. Furthermore, analysis of recorded speech samples showed that some 'normal' children were capable, at least at a given moment in time, of exhibiting more speech repetitions than were exhibited at a given instant by some members of a group of children who had come to be regarded by their parents as stutterers and the vast majority of whom were regarded as stutterers by trained personnel.

[7] At first glance this may seem to lead back to Johnson's diagnosogenic theory (*10, 11*), since there can hardly be any doubt that the temperament or standards of the parents may often determine whether or not these mild and transient struggle reactions develop into a serious disorder. But there is a fundamental difference between that theory and the concept presented here. Diagnosogenesis makes a sharp distinction between anticipatory struggle behavior and 'normal' nonfluency, and holds that the former results exclusively as a reaction to the latter. The view of the relationship between stuttering and normal nonfluency which has been presented here assumes that there is no sharp distinction between the two. It implies that by the time a parent becomes aware of the child's speech hesitancies as a problem these hesitancies have

scientific point of view the decision as to whether to stress the essential normalcy of these speech reactions in speaking to the mother or to discuss them as manifestations of 'stuttering' may be purely arbitrary. From a clinical point of view this is not arbitrary or inconsequential at all, but clinical experience tends to show that the decision is perhaps not as simple as it may appear. One's first impulse is to represent them as normal. This course may actually prove to be satisfactory, particularly when the parent herself has serious doubts as to whether to regard the nonfluencies as stuttering. When the parent is convinced that the child is 'stuttering,' however, it may not only fail to allay her anxieties to insist that he is speaking normally, but may serve to raise her suspicions that the speech clinician does not understand or is not interested in the child's problem. Effective counseling of the parent of a stuttering child can begin only with a large measure of acceptance of the parent's point of view, as Beasley (*1*) has pointed out. This does not mean that the parent needs to be told in these cases that the child is a 'stutterer.' She can be told, 'He is showing some stuttering *reactions*. Many children do. They are not serious at this age if they are handled properly, and they are very different from the symptoms of stuttering when it has become a severe problem.'

There is an additional question which may be considered advantageously in this general context. This article has touched briefly on the question of whether the first symptoms of stuttering may sometimes take certain forms other than simple repetition or prolongation. The problem takes on an almost totally new character when seen from the standpoint of the continuity of stuttering with certain forms of normal nonfluency. The crucial word in the question is 'first' or 'earliest.' As long as there is no sharp line which divides stuttering from normal nonfluency, such words appear to have little meaning. If one had unlimited power to trace the development of stuttering backward, the 'beginning' of stuttering in many cases would be seen to be a phantom which continued to elude discovery as events which seemed to represent the earliest onset of stuttering gave way successively to more and more remote beginnings. For the sake of convenience one may date the onset of stuttering from the moment the parents first noticed it, and by this definition it is possible that the disorder 'first begins' in the form of severe hard contacts. But such a definition must be accepted with the consciousness that in many cases what the parent calls the beginning of stuttering may have been only the beginning of a slightly more severe episode, or merely the moment

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already assumed the form of anticipatory struggle reactions of one degree of severity or another. It leaves room for the assumption that such struggle behavior develops not as a reaction to nonfluencies alone but also on the basis of delayed speech, articulatory defects, pronunciation difficulties, oral reading problems, faults of rate or phrasing, or any of a vast number of other possible threats of communicative failure or sources of speech pressure which abound in the environment of children in our society (*4*). It permits the belief that mild and transient struggle reactions exhibited by 'normal' children may develop into exceptionally severe and handicapping ones solely through an unusually severe *degree* of such pressures, and in the absence of any parental diagnosis of stuttering at all. In addition, as has been seen, it avoids what appears to be an essentially insoluble problem of clinical diagnosis.

when a mild tendency toward tensions and fragmentations of long standing first struck one of the parents as 'stuttering.'

Anxiety

One of the more significant results of this study was the finding that in the absence of any obvious signs of fear in the usual sense there may occur the most intense and elaborate reactions of struggle and strain. That an observation of this sort may be unexpected or difficult to understand is without doubt another by-product of the concept of primary and secondary stuttering with its assumption that forcing and associated mannerisms appear when the child has been made to fear repetitions and prolongations. The evidence seems to be that no such emotional or even highly conscious reaction is necessary for this type of behavior to develop. There are no ordinary evidences of chronic fear until the fourth developmental phase of stuttering (*3*). Yet associated symptoms are observed long before that, and often while the child in all probability still has no clear concept of himself as a stutterer. The explanation appears to lie in the inference that stuttering, even in its severest forms, is not primarily a response to fear at all. It is first and foremost a reaction to certain semiconscious presumptions, to subliminal anticipations, to various habits of preparation which Van Riper (*13*) refers to as 'preparatory sets,' or (inasmuch as stuttering may consist in part of the things the stutterer does in order to terminate the block) to transitory feelings of speech frustration. To put it as concretely as possible, in the absence of fear or any other intense feelings the child may let out all his breath, shut his eyes, press his lips together tightly, and do various other things as be begins to say 'buttermilk' simply because of his unverbalized assumption that this is the only possible way to say so difficult a word as 'buttermilk.'

To be sure, there may come a time when the child not only verbalizes his attitude toward the word but stands in very definite dread of saying it. When that time comes, his stuttering will be observed to come and go in response to changes in the intensity of his fears. When he fears stuttering, he by definition anticipates it, and the occasions on which he has no fears are also very likely to be occasions when he does not expect to stutter. In a situation in which he has little fear of stuttering but is keenly aware of his speech and all of the varied possibilities for having difficulty with it, and in which he consequently expects to stutter, the Phase Four stutterer tends to block as severely as ever. An example is the individual who has his greatest trouble in the speech clinic among other stutterers despite the fact that the situation is one he fears least. Those who stutter while speaking or reading aloud when alone also experience such a situation. Perhaps the most striking case in point is the apparent failure of the so-called 'tranquilizing' drugs to reduce stuttering in any outstanding way in most cases.

It is, of course, possible to employ the word 'fear' in a highly technical, special sense as the anticipation (however low in degree of consciousness) of frustration (however slight), and by this definition stuttering is probably always preceded by 'fear.' Consequently, it may be that few existing

theoretical formulations linking stuttering to anxiety will need to be revised in the light of these findings. The purpose of this discussion has been simply to point out that if 'fear' is understood in its clinical sense it does not seem correct to infer that it is the chief underlying basis of stuttering. Such an inference probably has a certain practical validity for most cases in Phase Four, but it is evidently not broad enough to apply to the disorder in all its developmental stages.

These remarks would appear to have at least two fairly important clinical implications. The first is that the observation of severe struggle behavior with many associated symptoms should probably never be taken in and of itself as an occasion for attempting to teach the stutterer an 'objective' attitude. The second is that where fear of stuttering does exist it should not be assumed that reducing it will necessarily reduce the stuttering a great deal in itself. It often does to some extent, because there may be less occasion to anticipate stuttering if the consequences are less fearful. Ordinarily, however, elimination of some of the stutterer's fear should be regarded only as a necessary preliminary or concomitant to working on the tacit assumptions and subliminal expectations and predictions which are more immediately responsible for his blockings. Systematic recognition is given to the importance of this in Johnson's emphasis on perceptual and evaluative factors in stuttering therapy (*11*) and in Van Riper's work on cancellations, pullouts, and preparatory sets (*13*).

Therapeutic Implications

In the final analysis, the most valid reason for segmenting the development of stuttering into distinct phases is that the varying forms which the disorder takes demand different methods of treatment. In the light of the findings of this study, it may be said that a limitation of existing remedial approaches to stuttering is their failure to take sufficient account of developmental distinctions among stutterers. This is particularly serious in view of the fact that so much stuttering therapy is done with groups. One of the remarkable features of the developmental phases of the disorder is the great overlapping of the age spans which they occupy (*3*). Some stutterers arrive at a relatively advanced stage precociously, while in others the process of development seems to be retarded or arrested. A cross-section of stutterers of a given age in the elementary or high school is likely to reveal individuals representing as many as three different phases of stuttering. The practice of combining them in a single clinical group and treating them alike may therefore need to be reconsidered thoughtfully. At best, this practice is probably not helpful to a certain proportion of the group. At worst, it is not impossible that measures which benefit the more advanced cases tend to stabilize and aggravate the stuttering of some of the less advanced ones.

If the various phases of stuttering are not to be treated alike, careful attention will need to be given to the development of remedial techniques suitable to each of them. The methods which have been most extensively elaborated and tested to date are for the most part applicable to the fourth phase of stuttering when it is most

serious and firmly established. The presumption should always be kept in view that the earlier the phase, the more effective the treatment which can be devised. The suggestions offered here, particularly with respect to Phases Two and Three, are to be regarded as no more than working hypotheses for the clinical experimentation which must be carried out if such therapies are ultimately to be discovered.

With regard to Phase One stuttering, the basic consideration is that it is an extremely widespread, episodic difficulty, probably not sharply distinguishable from normal nonfluency, with a strong bent toward spontaneous disappearance. The most important goal of therapy would appear to be to prevent the child from gaining that dangerous image of himself as a stutterer which underlies the disorder in its more chronic forms and, once acquired, is so difficult to erase. This means that the essential focus of therapy must be the child's reputation as a speaker in his family environment. With this goal in view, the most effective approach would seem to be parent counseling along the lines suggested by Johnson (*11*) and Van Riper (*13*) for handling early cases of stuttering. It would obviously be unwise to give the Phase One stutterer any form of training which he could interpret as assistance with his speech. If there is any specific implication regarding therapy with young stutterers which is to be derived from the findings of this study, it is that neither an extremely complex stuttering pattern nor occasional reactions of acute frustration should be accepted in themselves as evidence that the child should necessarily receive a more direct form of remedial work. Such manifestations should occasion no surprise or confusion. They are very frequently noted in young children who show every characteristic of Phase One stuttering, and they are to be treated accordingly.

The treatment of the Phase Two stutterer presents an extremely challenging clinical problem. It will be recalled that the term 'Phase Two stutterer' refers to the child whose difficulty has become relatively chronic, who has formed a conception of himself as a stutterer, who no longer exhibits the distinctive conjunction, preposition and pronoun repetitions of Phase One, but who still shows little or no concern about his stuttering and for the most part has difficulty when he 'talks fast and gets excited' rather than in response to specific words or situations (*3*). All too often this child is termed a 'primary stutterer' on the basis of his evident unconcern and the absence of such advanced features of stuttering as substitutions, word and situation fears, and the like. With this label, he tends to be shunned by speech clinicians fearful of turning him into a 'secondary' stutterer. Yet the fact that his difficulty has become chronic makes it fair to presume that he is now in urgent need of some kind of systematic therapy in addition to the counseling of his parents, and the fact that he already considers himself a stutterer makes it unlikely that any harm will come to him from the discovery that someone else regards him as one.

It is not easy to say precisely what measures should be adopted in treating Phase Two stutterers directly. To have a chance of success, therapy with such children must avoid any minute attention to symptoms which might

produce anxiety. It must also deal somehow with the Phase Two stutterer's characteristic lack of any deep feeling of need to work on his speech difficulty. At least two approaches suggest themselves which meet both of these requirements, and at the same time appear to deal in a fundamental way with the problem underlying the stuttering behavior. One is a rich program of general speech improvement aimed at superior levels of achievement in all aspects of communication with the exception of fluency. Such a program would provide stimulating and challenging training, appropriate to the child's age level, in voice and diction, conversation, oral interpretation, and extemporaneous public speaking. It does not seem farfetched to assume that at this early stage of the disorder a powerful feeling of success as a speaker carefully cultivated in this way might be enough to dissipate the attitudes on which stuttering appears in large part to be based. Clinical experience affords striking examples of stutterers who overcame their difficulty in the process of becoming outstanding speakers. In principle, this might be useful therapy even for the most advanced stutterer, but it would appear to be most easily applied before the individual has acquired any appreciable fear of speaking. A second approach which is related to the first, and might very well be used in conjunction with it, is to increase the child's sense of personal worth by every means possible—helping him to develop new interests, abilities and assets, minimizing old liabilities, and enhancing his prestige in the eyes of his classmates by investing him with certain unusual responsibilities. Measures of this type are calculated to strengthen the stutterer's feeling of adequacy as a person, and thereby to make him less prone to anticipate speech failure or to feel an excessive need for speech approval. References to this type of therapy are to be found in writings by Johnson (*11*) and Van Riper (*13*).

There is still another form of treatment which may be well worth considering for Phase Two, although it is not in good repute among speech clinicians, and that is suggestion. For the most part, suggestion has been tried with advanced cases of stuttering. It appears to fail with such cases primarily because of their strongly rooted fear of stuttering. The suggestion-inspired expectation of fluency which so often brings temporary relief tends to disintegrate as it comes into conflict with the powerful expectations of stuttering which are bound to arise sooner or later as long as the old fear of the consequences of stuttering persists. It might reasonably be argued, however, that inasmuch as there is so little fear of the consequences of stuttering in Phase Two, the effects of suggestion might be much more durable at this stage. It should also be considered that if suggestion should fail at this stage, there is at least little risk of the emotional upheaval and severe relapse often suffered as an aftermath by the more advanced stutterer whose hopes were raised so high by the temporary recovery. Suggestion does not, of course, necessarily mean hypnosis. In fact, it is probably employed most effectively with stutterers when it is applied indirectly, in the form of a method or technique in which the stutterer has a strong belief. From this point of

view suggestion need mean little more than a visible attitude of optimism and confidence on the part of the speech clinician in conjunction with such remedial measures as have already been discussed. The use of suggestion with Phase Two stutterers is recommended here, not on the basis of any deep conviction, but as an expedient which deserves to be subjected to clinical testing unprejudiced by the knowledge of its past failures with later phases of the disorder. It should always be borne in mind that it is through the acceptance of certain suggestions that children acquire the beliefs which appear to underlie stuttering, and that by the same token it is always a form of suggestion, broadly speaking, to which recovery from stuttering is to be attributed. There would appear to be little difference as far as some of the basic forces at work are concerned, between learning from a parent that one is doing poorly and may do worse, and learning from a speech clinician that one is doing well and will almost certainly do better.

In Phase Three the problem is that of treating an individual who exhibits almost every feature of fully developed stuttering except the anxiety. The Phase Three stutterer, it will be recalled, stutters in response to specific words and situations and is well aware of them as difficult. Although he may occasionally use word substitutions as a means of coping with momentary speech frustrations, he speaks freely in all situations; and while he recognizes that he has a problem, his dominant feeling about his stuttering is one of irritation or annoyance. The approach which suggests itself for dealing with this problem is to use every technique which has been devised for working directly on the stutterer's abnormal speech behavior as opposed to his fears and avoidances. Among the best of these techniques at the present time are elimination of associated mannerisms, perceptual and evaluative reorientation (*11, 14*), and cancellations and pull-outs (*13*). Such procedures should, of course, be discontinued at once if there is any sign that they are increasing the stutterer's anxiety about his speech. In addition to techniques of this type, the methods discussed in connection with Phase Two can undoubtedly be used to advantage with some stutterers in Phase Three, just as parent counseling continues to be of value in Phase Two.

Phase Four, typified above all by chronic anxiety and embarrassment, represents stuttering at the apex of its development. In this phase considerable use must be made, in addition to many of the methods already mentioned, of the measures for reducing fear and avoidance which have been developed in detail for treating so-called 'secondary' stutterers.

Suggestions for Research

It is safe to say that essentially all of the findings of this study need to be subjected to careful verification. This is particularly true of the quantitative data (*2*). No numerical results derived from samples can be regarded as correct in any satisfactory scientific sense unless based on valid estimates of sampling errors. These findings must be regarded merely as clinical observations which are subject to correction and refinement through more detailed study.

There appear to be several promising areas of research on the development of stuttering which were not entered at all in this investigation. More needs to be known about the age levels below seven or eight with regard to word and sound difficulties, substitutions, and other features of stuttering about which young children are so rarely questioned. There is a special need for longitudinal studies of a type which could be conducted quite easily in a public school system, where the same children are available for examination from grade to grade; such studies, even if performed on a relatively small number of subjects, would serve as a valuable check on many of the conclusions reported here. It would also be of value to know how the observations of this study would have differed if they had not been based strictly on subjects drawn from a clinic population. There is a particularly urgent need for clarification of the relationship between stuttering in its early phases and so-called 'normal' nonfluency by means of studies of the consistency effect in the speech interruptions of children who are regarded as normal speakers. Above all, a vast amount of research and clinical trial-and-error is needed to determine the type of therapy most suitable at each of the levels of development of stuttering.

Summary

This article is concerned with certain broad conclusions to be drawn from a study of the development of stuttering reported in two previous articles (*2, 3*): (a) The concept of primary and secondary stuttering provides an inadequate and misleading conceptual scheme of the course of development of the disorder. (b) At every level of development the integral symptoms of stuttering may be viewed as anticipatory struggle behavior consisting of tension and fragmentation in speech. (c) In stuttering, as in most other behavior disorders, there appears to be no sharp line which divides the 'normal' from the 'abnormal.' (d) Stuttering is not caused directly by fear or anxiety as much as by the stutterer's anticipations, predictions, or preconceptions with regard to speech. (e) Each of the four major phases into which the development of stuttering may be divided demands an essentially different method of clinical treatment.

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CLINICAL FORUM

• Aphasia in Children

The concept of aphasia in children presented here has two major aspects: (a) We believe that the major differentiating factor in aphasia is the disruption in, or failure to develop, speech for oral communication, that aphasia is the inability to understand and/or use *spoken* language. (b) We believe that the core of the aphasic disability is a disorder in the perception of temporal sequence, auditory and perhaps also visual. In a differential diagnosis of aphasia, this unique language disability must be distinguished from the language disturbances characteristic of other handicaps, including aphasic language manifestations from the speech and language effects of hearing impairment and of 'Strauss syndrome' brain injury.

Since tests to ascertain a disorder in perception of temporal sequence suitable for use with young children are not available, we have no choice but to pursue an empirical approach. The child's response to the methodology used during a period of diagnostic teaching is of major importance in arriving at an accurate differential diagnosis.

Testing for Aphasia. There is no single test or series of tests or examinations at present, to our knowledge, that will differentiate aphasia in children or that will give reliable indications of a disorder in the perception of temporal sequence in young children. This certainly is an area for scientific experimentation and research. Until such tests are available and adequate for use with three- and four-year-old nonverbal children, we would not presume to diagnose the presence or absence of aphasia in a young child on the basis of one examination. When we suspect aphasia in a child our diagnosis is always a tentative one to be confirmed or revised after a period of diagnostic teaching. Similarly, when we believe that a very young child is deaf, this diagnosis, too, is made on a tentative basis until the possibilities of aphasia can be ruled out. Since our goal is rehabilitation of handicapped children, we need make no apologies for pursuing an empirical approach to a child's problem in the absence of conclusive test results. The primary and perhaps the only value in having a clear diagnosis is that it points the way to appropriate therapy or treatment. If failure or success with a particular treatment or methodology helps to clarify the diagnosis, this is all to the good.

Hearing Loss and Aphasia. The problem of differentiating hearing loss from aphasia involves not only the measurement of the loss but also an understanding or agreement as to the effects of hearing loss on the development of oral communication.

We have, in our Children's Hearing and Speech School, 23 children rang-

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ing in age from five to 11 years whom we have diagnosed as having sensory or receptive aphasia. At least three hearing tests have been made by standard audiometric techniques on each of these children. The audiograms of only six children are both reasonably consistent from one test to the other and in agreement with clinical observations. Of these six, one showed normal hearing, two have moderately severe losses, and three have severe losses. An additional four children gave fairly consistent audiograms, but the thresholds are not confirmed by clinical observations. For seven children who gave widely different thresholds on retest by standard audiometry no reliable estimate of hearing acuity could be made.

Five children were reported by two, and in some cases three, different examiners as impossible to test by standard audiometric techniques. Galvanic Skin Resistance (GSR) tests on seven of the 10 children showed fairly consistent responses on test retest by standard audiometry. The GSR responses and standard audiometry thresholds were in agreement in only two cases. In reviewing these test findings it should be noted that only one child in the entire group of 23 gave normal thresholds when tested by standard audiometry. In other words, 22 of these 23 children do not have 'normal hearing' in the generally accepted meaning of this term, but the abnormality is a type that cannot be described in decibels and is not readily assessed by audiometric means.

Arrival at a diagnosis of aphasia in these children reflects our understanding of what the effect of impaired hearing is on the speech and language learning process. Experience has demonstrated to our satisfaction that a child with no major handicap other than hearing impairment, no matter how severe the hearing loss, will learn to understand and use spoken language when taught by the conventional whole-word methods used in teaching deaf children.

Nature of Aphasia. There are some children who at first seem to have hearing impairment as their major or only handicap but who do not learn to lipread or to talk when taught as deaf children. In these cases we change to the all sensory-motor approach known as the McGinnis-CID method (*Volta Rev.*, 58, 1956, 239-244). This method differs from the methods that succeed with deaf children in that it starts with the sound elements and involves reading the visual symbols or letters that represent the sounds, tracing or writing the visual letter symbol for kinesthetic reinforcement, isolating the sound for visual recognition through lipreading, and isolating the sound for auditory perception.

With very few exceptions in our experience, the children who could not learn to lipread and talk when taught by the whole-word method began to achieve these skills when we changed to the elemental approach. Hirsh (*J. acoust. Soc. Amer.*, 31, 1959, 759-767) reported a series of experiments that were undertaken within a 'theoretical framework that holds that time is the dimension within which patterns are articulated for hearing in a manner analogous to the way in which space is the patterning dimension for vision.' As a result of his experiments, Hirsh concluded that the judgment of temporal sequence involves more of

the perceptual system than the ear itself and that 'we must look to more central structures for the anatomical and physiological correlates of such a judgment.'

If we may apply Hirsh's findings to the area of language learning, we may state that for a child to learn to recognize and interpret speech presented as whole words, he must have an unimpaired temporal sense, that is, he must be able to recognize auditory symbols presented in a prescribed sequence in time. A child who fails to learn by the whole-word method involving temporal patterning but succeeds in learning by the elemental approach involving spatial patterning has indicated to us something significant about the nature of his disability. He has indicated that he has a central disorder involving the perception of temporal sequence and we believe that this is the basic nature of the disability of aphasia.

Brain Injury and Aphasia. Strauss and Kephart (*Psychopathology and Education of the Brain-Injured Child*, Vol. 2, chap. 4) describe the language problems characteristic of brain-injured children and also mention aphasia as a condition that frequently occurs in brain-injured children. Without going into Strauss' description of aphasia, we can say that the important fact for our discussion is simply that Strauss differentiated between the type of language behavior that is characteristic of, and attributable to, brain injury of the type described in his two volumes, and another type of language disorder known as aphasia. Others have failed to make this distinction, and in so doing, we feel they have confused the issue of aphasia in children.

Just as severely mentally deficient children have a characteristic type of problem in oral communication that is a direct result of their deficiency and just as hearing handicapped children have a characteristic type of problem in oral communication that is the direct result of their hearing impairment, brain-injured children who fit the Strauss description have a characteristic problem in oral communication as a result of their problem of stabilizing perceptions and developing concepts; but these various problems in oral communication cannot be considered as aphasia. Of course, Strauss syndrome brain-injured children may be also handicapped by aphasia, and deaf children may also be aphasic. In fact, dual or multiple handicap is not uncommon.

Case Studies. The following case summaries may serve to clarify our concept of aphasia as differentiated from hearing loss and brain injury and also to point up a few areas of disagreement.

Case 1. Billy, who is now seven years old, has worn a hearing aid since the age of 2-6. He is a 'natural lipreader' and a fluent talker. He is in the fast reading group in a class of normal hearing children. Another center diagnosed his problem as 'moderately severe auditory receptive aphasia, dyslexia, and dysgraphia,' primarily because he 'fails to understand connected speech which contains abstract or relative words.' Our diagnosis is hearing impairment with no language disability. The fact that the child learned oral communication readily through the repetition of whole words and phrases indicates that he does not have a disorder of perception of temporal sequence which we believe is the basis of aphasia.

Case 2. Jean, now almost seven, had normal hearing and speech up to the age of 2-6, when she was hospitalized for purulent meningitis and measles. She was referred to our center because of apparent

deafness, and our tests and observations, although inconsistent, seemed to confirm this. We initiated a program of communicative retraining appropriate for a child with severe hearing loss; but in spite of this, Jean's speech deteriorated into jargon and finally ceased. She could not lipread or understand any of the words she had used prior to her illness. She disliked her lessons intensely and presented severe behavior problems at home as well as in therapy. After about six months of completely unproductive therapy on this basis, we changed to the teaching method for aphasic children. She began immediately to achieve speech and language through the elemental approach, and she became simultaneously a happy, cooperative pupil. This child was recently examined at another center, which reported that she 'presents a clinical picture of bilateral deafness' and that 'her speech and language deficit is due to her severe sensory impairment.' Her response to the two types of teaching procedures was the basis of our diagnosis of sensory aphasia.

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• Involuntary Vocalization

Since reporting a case of involuntary vocalization (*J. Speech Hearing Dis.*, 25, 1960, 197), the author has received communications which clarify the phenomenon and substantiate the fact that such an entity exists and may in rare cases be encountered by the speech clinician. It would appear important that speech pathologists be cognizant of the problem inasmuch as it may be met with, although infrequently, in diagnosis. The communicative aspects of this rare disorder are such that it might be brought to the attention of the speech pathologist in some instances, and particularly at its outset.

Georges Gilles De La Tourette, a Paris physician (1857-1904), first described a previously unknown nervous disorder, and summarized his views on the subject in 1899 in a paper entitled 'Maladie de Tics Convulsifs.' In 1885 he had published records of nine sporadic cases which he himself had collected. Mazur (in an unpublished paper, Jordanburn Nerve Hospital, Edinburgh) has summarized an account of Gilles De La Tourette's original description of the condition:

> About the age of seven or eight, the child begins to exhibit a series of tics. These are at first limited preferably to the facial musculature. At this stage too, respiratory laryngeal noises are occasionally superadded. The movements may be confined for a long time to the face, but later they gradually invade the shoulders and arms. The muscles of the larynx sometimes participate in the abnormal functioning, hence it is that many sufferers from the tic give vent to quick expiratory 'hems' and 'ahs.' The disease may be limited to this stage, but it is not uncommon to find a few months or years after the beginning of the facial movements that the inarticulate laryngeal sound becomes organized—the patient may one day give vent to a word or short phrase of quite special character, inasmuch as its meaning is obscene. These may be exclaimed in a loud voice, without any attempt at restraint. Another psychical stigma—echolalia—is occasionally, though less frequently, observed in these cases.

Mazur elaborated on the Gilles De La Tourette syndrome as follows:

> This syndrome is interesting from the viewpoint of nosology since it exhibits a combination of neuropsychiatric diversities, which, however common individually, are seldom coordinated in one clinical entity. The syndrome displays a triad of symptoms, namely, (a) multiple tics involving various groups of muscles, (b) involuntary explosive utterances and other disturbances of speech and voice mechanism, and (c) various echo-phenomena.

The tic initially affects only the orbicularis oculi or some other single facial muscle. It subsequently spreads

to the other muscles of the face, then to the neck and upper extremities, and sometimes to the whole musculature of the body. The second component of this syndrome is a group of manifestations related to the functions of respiration, phonation, and expression by speech or gestures. These may include respiratory noises, involuntary explosive utterances such as imitation of sounds emitted by various animals, outcries of inarticulate noises (e. g., 'sh,' 'psht,' 'ti'), exclamation of unintelligible or senseless words, and coprolalic interjections ranging from profanities to vulgar terms of a sexual nature. The various echo-phenomena include echolalia, echokinesis, and echomimia. Other characteristics of this syndrome are (a) its onset in childhood (6-16 years); (b) the order of symptoms from muscular twitching to explosive utterances, the latter showing a gradual development from inarticulate to articulate outcries; (c) its sometimes unpredictable course in which arrest may occur at any stage, and periods of remission may alternate with exacerbation; and (d) the accompanying mental symptoms, including absent-mindedness, inability to concentrate, restlessness, and obsessive-compulsive manifestations, some cases culminating in psychoneurosis or even psychotic illness. There is also resistence to therapeutic efforts as the disappearance of a tic might merely mean migration to another group of muscles or replacement by a different symptom. The syndrome is also characterized by its rare occurrence; Asher (*Amer. J. Psychiat.*, 32, 1948, 234-247) collected four cases among 5000 outpatients and 9000 inpatient admissions to the Henry Phillips Psychiatric Clinic, Baltimore, between 1918 and 1947.

The etiology of Gilles De La Tourette's disease is apparently obscure, and has been disputed from the outset. The disorder has been explained by some as a hereditary idiopathic weakness of the corpus striatum or as a sequel of such diverse etiological factors as emotional trauma, infection, or organic brain disease. It has an affinity to postencephalitic and other organic syndromes.

Mazur also presented a case report of a 15-year-old boy with no history of neurologic or psychiatric disease in the family.

> Birth was normal and the usual milestones of infancy and early childhood were passed at the usual times and without mishap. He was referred because of inability to concentrate, fidgetiness, and involuntary movements. Neurological examination revealed no abnormalities. In the opinion of the parents, a tonsillectomy at age five marked the appearance of nervous symptoms. During hospitalization he engaged in crying and in refusal of food. Following discharge, he showed a marked depressive reaction, lost his appetite, and began having nightmares. He also developed blinking of the eye shortly after the operation. At that time he acquired a number of 'habits' such as clearing his throat and sniffing. A few years later he began turning his head to one side and this later developed into a brisk tossing of his head to which was later added twitching of his shoulders. After the boy left school, his tic decreased in frequency and severity, but during this period of improvement he developed other symptoms; his speech, previously jerky, now showed, in addition, inequality of intonation. He would shout out in a loud voice a word or two of a sentence, usually the first word or two, and at times would emit an explosive utterance without apparent cause or provocation and no consideration for place or occasion. His outcries, at first inarticulate, soon assumed intelligibility, and his parents with dismay recognized them as swear

words and vulgar terms of a sexual nature. The parents agreed that this behavior was quite foreign to the patient. They described him as a well-behaved and good-natured boy. His general behavior did not seem affected and his shouting outbursts and coprolalia appeared to be an isolated phenomenon bearing the stigmata of involuntary automatic actions. It was also noted that he acquired a curious habit of repeating words or parts of a sentence just heard, especially if these were spoken in the imperative mood. Intelligence and personality tests showed that he was well endowed intellectually and that his personality was of an obsessive type. At a later date when the patient was last seen, he was apparently free from symptoms except for blinking of the eyes. Otherwise his condition appeared to have undergone a complete remission.

Mary Huber (personal communication, 1960) describes a case of involuntary vocalization which she observed in the University of Wisconsin General Hospital in 1944:

> A patient was referred to as the 'barking girl,' inasmuch as a short time after a tonsillectomy in her early teens, she began making sharp barking sounds, vocally produced phenomena which occurred intermittently during speech and just as often when not speaking in the presence of others as well as when she considered herself alone. The patient was treated by psychiatrists, and received a prefrontal lobotomy. A barrage of medical and psychological tests showed no positive results. After the lobotomy she was silent for a day or so and then had to be placed in a soundproof room because she began to use obscene language. This continued for a few days, then stopped, and the barking returned. Intelligence testing before and after the lobotomy revealed normal intellectual functioning. She was eventually hospitalized in a mental institution where she appeared to adjust satisfactorily, though the barking continued intermittently. During a 15-minute interview with the patient at a later date, no barking was observed.

Hayes A. Newby reports having recently had experience with such a case, a boy of 17 years with multiple tics and involuntary vocalization, including barking and utterance of obscenities. The patient was seen by various specialists in the Stanford Medical Center's Rehabilitation Service, and is now receiving psychiatric treatment.

In a letter to the author M. F. Schwartz describes his interest in the spontaneous vocalizations produced by Faradic stimulation of certain areas on and within the precentral motor cortex. Such stimulation, he reports, frequently results in prolonged spontaneous and uncontrollable vocalizations in conjunction with occasional fibrillatory twitchings of the facial musculature.

In conclusion, it should be reiterated that the disease is a rare phenomenon. Any of the individual neuropsychiatric manifestations such as tics or echolalia may be seen more commonly, but the total syndrome will not be encountered very frequently. One should therefore not be too hasty in diagnosis if only individual isolated symptoms are observed.

Further references to Gilles De La Tourette's disease may be found in *J. ment. Sci.*, 105, 1959, 1078, and in *Amer. J. Psychiat.*, 115, 1959, 715-723.

Acknowledgments. The author is grateful for information supplied by Edward Leach, M. A., and Sylvia Richardson, M. D., University of Oklahoma Medical Center; Edward Levinson, M. D., Montreal, Canada; Mary Huber, Ph.D., Los Angeles State College; Martin F. Schwartz, Ohio State University; and Hayes A. Newby, Ph.D., Stanford Medical Center.

ROBERT F. HEJNA

University of Connecticut

• A Stutterer with a Low IQ

Many experts in the field of speech pathology share the rather common perception that 'stutterers are generally bright persons, and are of average intelligence and higher.' This perceptual stereotype is strengthened by some of the recent psychologic theories and findings, e. g., that a person having a physical handicap or psychic deficit will tend to overcompensate or overcorrect the deficiency whether it is real or imagined. Several leading speech pathologists who were stutterers themselves and are obviously brilliant persons lend face validity to the generally accepted perception. Further, many speech clinicians have found many clinical cases with high IQs.

There is no doubt that many stutterers compensate for their speech impediment in various ways and to various degrees. It must be recognized, however, that all stutterers do not have high or average IQs and that some compensate poorly for their impediment and some do not compensate at all. The following case is presented as a somewhat iconoclastic example:

Pamela is an 11-year-old girl who stutters and blinks her eyes when she is nonfluent. She is from a lower middle socioeconomic class family. Her father is a high school graduate and a sergeant in the Air Force. He stutters intermittently and so does his brother, Pamela's uncle. Pamela's mother describes herself as a housewife and does not appear overly concerned with Pamela's stuttering which she describes as 'occasional.' According to her mother, Pamela began to speak words at about 12 months of age. She first noticed Pamela's stuttering at about age five.

Pamela was referred to the clinician by the school principal. As part of the intake procedure she was administered Form B of the Otis Intelligence tests, the Wechsler Intelligence Scale for Children, and the Rorschach. Testing on the Otis test yielded an IQ of 80; WISC Full-Scale IQ was 82 (dull normal). Verbal IQ was 75 and Performance IQ was 93. The Rorschach did not yield any evidence of psychic disturbance or conflicts, except for mild signs of hysterical tendencies. The record contained signs of moderate defensiveness in relating to persons.

She was seen for psychotherapy which began by the method of 'reality reporting,' which is the exploration of emotional and intellectual needs and attitudes related to the client's adjustment to the present environment, prior to any depth exploration of feelings and attitudes related to the onset of stuttering.

Pamela came in intermittently for her appointments. Of 16 appointments, 11 were cancelled by her mother for a variety of reasons. Dancing lessons and school social activities appeared to take precedence. Sometimes no reason was given for cancellation. In addition, Pamela did not appear to be motivated for either psychotherapy or speech correction. Therapy sessions showed she possessed little insight into her thinking and behavior. She appeared to be shallow, both intellectually and emotionally, and unable to comprehend the purpose of her visits to the clinician despite reiteration on his part.

Because of the lack of motivation for therapy, the low intelligence, the unwillingness to verbalize, and the obvious ambivalence on the part of her mother toward therapy, it was decided that prognosis for psychological and speech reeducation was poor and that therapy should be terminated.

The writer's purpose in presenting this case is to stress the inherent danger of stereotyping and to indicate the need for continual realignment of clinical perception which is vital if speech therapy and speech pathology are to be active and dynamic fields of endeavor.

VINCENT WALLEN

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Report from India

At the suggestion of Dr. Charles Van Riper we are printing a letter received by him from C. A. Coelho, M.A., of Bombay, India. To the best of our knowledge, Mr. Coelho is the only representative of our profession in India. Aside from the human interest value that this correspondence must certainly contain for many of our readers, it is the hope of the editor and Dr. Van Riper that its publication in the *Journal* may encourage the members of some academic institution to provide some financial assistance toward the pursuit of a doctoral degree in speech pathology in the United States.

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DEAR DR. VAN RIPER:

I thank you very much for your kind letter of the 22nd of February. Miss Renfrew, who was in Bombay last month, had told me that she would put me in touch with you so that I could get a number of my difficulties with regard to Speech Pathology resolved through correspondence with you. I am glad that such an opportunity has arrived at your kind initiative.

I had secured a copy of your booklet on *Stuttering* last October. A week ago I have also secured a copy of the *Handbook of Speech Pathology* edited by L. E. Travis. I have yet to make a detailed study of your contribution on 'Symptomatic Therapy for Stuttering,' but on a preliminary perusal I am glad that you recommend symptomatic therapy. For myself, I have been defending my method on the grounds that etiological factors, especially remote ones, are hardly capable of direct treatment, and therefore the only thing left to do was to treat the symptoms which are self-perpetuating.

I understand that what the English writers call 'stammering' is called 'stuttering' in your country. Instead of being confused by this terminology, however, I have been led by my study of the symptomology of the disorder to make a distinction between real stuttering and stammering. The repetitive symptom shown by most children at the onset of the trouble and directly characterized (if not caused) by the clonic spasm—I call Stuttering (onomatopoeically). It is only later, when the child is conscious of his trouble and tries to suppress it with an effort, that the clonic spasm becomes tonic. The speech disorder of adolescents and adults betraying the combined clonic-tonic spasm could in my view be classified as 'stammering.' You will forgive me for this hair-splitting. For me it is essential for the task of investigating the symptoms of the abnormality. During the stuttering stage, the child shows no other symptom but the repetition of the first part of the syllable or the first syllable itself. (Stuttering is rarely diplo- or multisyllabic.) At the primary stage of stuttering (up to the school-going age) the child's speech is fluent, despite repetition.

The chief characteristic of stammering seems to be nonfluency. This disjointed manner of utterance is due to the time taken by the patient to get his 'difficult' word out. The effort to get it out is shown by localized tremors and abnormal postures of the speech and peripheral muscles. I would not aver that stammering consists *essentially* of these tremors, but would describe these tremors as accidental and subsidiary symptoms.

In his book on *Stuttering*, Barbara cites 'dysphemia' to be the culprit behind the stammering phenomenon. Whatever the correct connotation of the term might be (and I plead ignorance of the terminology), I feel the principal factor in symptomatology is the psychoneural interference with the fluent outflow of the 'speaking breath.' May be that the emphasis on the respiratory aspect of stammering is old-fashioned, but in every single case that I have handled over years I find that the fluency is directly due to the sudden 'dying out' of the outward breath-stream. When the breath-blockage occurs, the patient keeps his mouth open and tries to go on with his speech despite this 'suspended animation.' He tries to compensate the lack of aerodynamic pressure with muscular effort. I have found that if the patients are trained to breathe in periodically, rhythmically and with a moderate volocity (which is controlled by a small mechanical device fixed onto the palate between the second or third premolars), the so-called

'difficult' syllable comes out without trouble. The vocalized expiration becomes as relaxed as the breath intake (inspiration).

I do agree that much of the symptomatology is the fear element, but it is not so much the fear of the contortions and phonetic rituals as of the breath-blockage already foreseen. The spasmodic rituals are the means the patient has recourse to in order to forestall or release the blockage. Neither would I call these symptoms a 'ritual.' Unconsciously, and sometimes consciously even, the patient goes on trying different kinds of contortions to find his speech liberation. The pattern of symptoms goes on changing from time to time, so long as the patient is in search of less ostensible devices for forcing out the difficult syllable. There need not be a life-long consistency in the manner in which the subconscious 'protests' against the interruption to fluency. From this point of view, I would not call the Pavlovian 'reflexes' permanently 'conditioned.' The primary spasm has still to be located by me with any degree of certainty. But it seems to me that this is situated in the region of the glottis. In some cases, however, I have noticed that the patient brings on terrible spasms of the diaphragmatic region in trying to speak on his residual breath. But I do not know whether the spasmodic condition in the diaphragmatic region is subsidiary to the primary spasm or is the primary spasm itself.

If you ask me which—the fear element or the suspended animation—I must plead ignorance again. While trying to study the classic distinction between etiology and symptomatology, I feel that the dividing line between proximate cause and primary result is not a line at all; it is a broad belt, almost a 'No Man's Land' where cause and consequence frequently exchange roles. It is difficult to determine the beginning of the vicious circle.

Another observation that leads me to attribute most of the stammer symptom to a respiratory cause is the fact that the stammering occurs at the beginning of a 'breath-phrase' (I mean the group of words one is able to articulate in one breath). In his fear of the 'enemy word or phrase' already recognized in the offing, the patient forgets to store his lungs with adequate air. When compelled to begin, he speaks on borrowed air (borrowed from the 'residual bank'). This is insufficient to set the sound free from the tonic grip and then follows the struggle. The Thug of Indian history knew that the victim could be strangulated with a piece of cloth, and how each one reacted to the pressure on the larynx was a matter of detail to him. I compare the primary clonic-tonic spasm to the 'Thug's strangulation,' and would not worry much as to how and which part of the system reacts ostensibly to the breath-blockage.

I cannot be dogmatic and say that all the juniors I have examined are stutterers and all the older patients are stammerers. So far I have come across three children (all below five) who showed typical stammering (without clonicity). All three were precocious and the parents had made them aware of their defect at the very start. On the other hand I have come across only three stutterers among adults: one was a borderline case (a part-time inmate of a mental hospital) and the other two showed a very low IQ and carried a child-like attitude into their thirties.

I must confess that I have done very little reading on the subject for obvious reasons. There is no Speech Therapy Institution in India. Neither is there anybody either in the Medical or the Teaching professions whom I could consult or learn from. Whatever I claim to know of the subject of Stammering is from my own personal experience as a stammerer for the first 25 years of my life, and from the detailed research I have been doing for several years now on the hundreds of cases that have come to me for examination (though not all of them chose to be treated for various reasons). Hence everything that you might have to say on my theories will be gladly accepted, and every reprint of your articles that you might send me will be treasured in my scanty library. I am sorry if my letter on Symptomatology of Stammering is long: in my attempt to explain myself I must have carried quite a good number of coals to Newcastle. I hope you will forgive me. To try and study the speech deformities of six-and-a-half million of my fellow-Indians (one-and-a-half per cent of our population) who speak over 600 languages and dialects, without any guidance or any reference books or colleagues, has been a stupendous task for me. Speech Therapy is still a 'freak science' in my country and to hope for Governmental aid and recognition is vain for the time being. This apologia should itself serve as an apology for the length of my letter.

In response to your request at the end of your letter of the 22nd ultimo, I am giving you below a few of my observations made in the course of my work with polylingual speech defectives:

1. *Indian Languages vis-a-vis the Speech Defect Problem.* While examining and train-

ing patients I have had perforce to take into account the mother tongue of each of them, because I feel that the nature of one's native language has much to do with the onset and aggravation of one's speech defect. The literates (most illiterates do not go in for speech therapy) are scarcely unilingual; having to employ different languages in different environments, they have to use on an average two languages in Northern India and three or more in South India. The incidence of stammer is more in those languages with which the patient is not familiar. 'Fishing for words' becomes the occasion for further stammering.

It is estimated that India has between 600 to 700 languages and dialects, though only 14 provincial languages and English have literature and are used in schools. The Indian languages come approximately under the following groupings: (a) Aryan languages (of Sanskritic origin) spoken by about 200 millions; (b) Dravidian languages (spoken in S. India) spoken by about 100 millions; and (c) Miscellaneous groups (viz., the Indo-Mongolian dialects of N.E., tribal or aboriginal languages—mostly of the proto-Dravidian variety—used in isolated pockets of the country, and dialects of the Persian and Arabic families spoken in the N.W.) used by about 100 millions.

I know practically nothing of the language character of the Miscellaneous group, but can describe the relation of the other two groups with Speech Pathology problems.

While the North Indian group is generally slow in pace, the South Indian languages are generally termed 'fast.' Proceeding from the premise that the slower the language the greater is the ease of expression (as in singing, where most syllables are far removed from one another and where the tone dominates the articulatory performance, and of course where no stammerer stammers), I have formed these tentative conclusions:

The stammering difficulty becomes acute when the first syllable of the 'breath-phrase' is accented or short. Also the stumbling is more at 'doubled consonants' even in the middle of the phrase. I am giving you below the same sentence in English, Marathi (of the Aryan group) and in Kannada (of the Dravidian group). *English:* 'You had called me to your house'—two short syllables out of seven. *Marathi:* 'Thumi mala thumcha gharee bolovla hotha'—five out of 13. *Kannada:* 'Neevu nannannu nimma manege karediddiri'—14 out of 15.

By 'doubling of consonants' I mean that the doubling is phonetic as well as orthographic. In the English word 'pebble' you double the *b* orthographically, but phonetically you double the *p*. Hence you pronounce 'pebble' as 'ppeble.' In other words, while accenting the first syllable you stress the first part of the syllable. In the Indian languages, on the contrary, the doubling is both phonetic and orthographic. While you would pronounce 'Kannada' as 'KKanada,' we pronounced it as 'Kan-nada.' Thus I have a feeling that when a syllable is short the tendency to get 'stuck' is more pronounced. When a syllable is double, even in the middle of the word, it will aggravate the tendency to stutter. When the word begins with an accent, the stammer is much more because the accent itself involves a jerk of the voice (which in turn is a spasm of sorts) and because the initial syllable (if consonantal) requires an extra stressing (pressing) of the speech muscles concerned (as in 'pputing a ppeble in the kketle').

2. *Phonetic and Phonemic Treatment of Functional Speech Disorders.* In my speech re-education of the patients who suffer from one or another type of functional speech disorder as well as of postoperative cleft palate patients, I have had to resort mainly to the restoration of their 'missing consonants' through the phonetic method. As you might be aware, we have in India a popular pattern of the alphabet, traditionally believed to have been invented by Panini in the fourth century A.D. (It is called the Nagari or the 'civic, civilized' alphabet.) Its chief merits are: (a) The vowels are separated from the consonants, (b) the consonantal series are arranged in such a way that each group is produced by the same physiological movement and based at the same anatomical region, e.g., the root of the tongue for the *gutterals*, the middle tongue for the *palatals*, etc. Of course, I have had to enlarge and in some respects modify this alphabet in order to make it more representative of the current languages and to make it also a pattern and a plan both for diagnosis and for treatment. Additionally, I discovered that even the physiologically arranged list of consonants is not always a satisfactory guide in working out a line of practice for certain individuals. This led me to analyze each consonant into its components and to determine their phonemes. By forming a series of nuclear phonemes and basing the lesson in that order, I have succeeded in restoring the 'missing' consonant to the patients.

3. *General Phonology and Articulatory Errors.* A third field of research that offers plenty of scope for investigation appears to me to be the relation between the laws operating in General linguistics and those motivating articulatory speech defects. If the so-called vulgarisms, slang, and mispronunciations of the classical languages have resulted in the development of our modern languages and if these changes in phonology, etymology, and morphology have proceeded according to fixed laws, I wonder why one cannot find out the laws underlying pathological speech—particularly why certain 'cerebralizations,' 'rhotacisms,' etc., cannot be traced to their relevant anatomical and neural origins.

I am writing to you on the above three subjects with a view to securing your advice whether any one of them could form the subject of a thesis acceptable to any of your American Universities in exchange for an extraneous doctorate. As I have said in my other letter, I do not have professional qualifications in Speech Therapy. Though I have been recently appointed by the Bombay Municipal Corporation as an Honorary Lecturer in the subject at their Nair Dental College (and this is the first time in our history that any University, Governmental, or Municipal body recognizes speech therapy as a subject worth studying), there is a chance of the Government and other Agencies opening a full-fledged training institute for speech therapy in the near future. I have been sounded by the authorities about getting myself qualified in the line, but in the absence of local facilities I would have to go overseas for the qualification. This again is impossible for me for lack of financial resources. Hence I wonder if you could assist me in obtaining a doctorate in Psycholinguistics of Phonetics from one of your universities or from the American Speech and Hearing Association.

CHARLES A. COELHO, M.A.

Hon. Lecturer in Speech Therapy
Nair Dental College, Bombay

At our request Mr. Coelho supplied the following information with reference to his educational background, his reasons for becoming interested in speech disorders, and his professional affiliations up to the present time.

I obtained an M.A. degree of the Bombay University in 1933 in Indology. During my post graduate studies and ever since, I have taken a particular interest in all branches of Indian linguistics, particularly Etymology, Phonology and Phonemics. This was not only because these subjects had a great attraction for me from my childhood but also because owing to my change of residence from S. India to N. India, I have had to acquaint myself with a number of ancient and modern Indian languages.

My special subjects throughout my college career were English and Sanskrit. After doing my M.A., I have had occasions of studying unofficially under the late Rev. Fr. H. Heras, S.J., who is known in our country as the pioneer of research in Indology. Thus, I have gained knowledge of the comparative philology of Sanskrit (Aryan) and Mohenjodaro (proto-Dravidian).

From my very childhood, I was severely handicapped with acute stammering up to the age of 24. The question of finding help from any speech therapist never arose because we have no scientific speech therapy even now. My flair for philology and a private study of speech psychology and speech physiology enabled me to evolve my own method of finding speech liberation. For about 20 years thereafter, I was helping other sufferers to overcome their difficulties. But this was more on an amateurish rather than a professional basis because I was compelled to earn my living as a teacher in a regular high school and later as an executive in pharmaceutical firms. Since 1955, I have been doing speech therapy on a whole-time basis and have been carefully maintaining my notes of research in every case that I have had the opportunity to examine or treat. Because of the fact that, to my knowledge, there is no educational or governmental body that has yet shown interest in the subject of speech abnormalities in India and because of lack of contact with foreign bodies specializing in speech therapy, I cannot claim that I have done any extensive reading on the theoretical aspect of speech therapy. All the same, the peculiar set-up of the language pattern in my country has compelled me to investigate in every case, the incidence of stammering or lisping in each language group of India. Secondly, I have noticed that the intensity of the same patient's difficulties varies from one language to another (we hardly have any patient speaking a single language: most of the patients speak a minimum of three languages and well-educated ones speak five or more). This particular field of research, viz., speech defects vis-a-vis multi-lingualism, remains

practically untouched and I propose to do some work in this line provided I get someone to sponsor my research.

The first time speech therapy ever received any official recognition in India was last year when the Bombay Municipal Corporation appointed me an Hon. Lecturer in one of their medical colleges. Besides, I have been a casual Hon. Lecturer in speech therapy at the All India Institute of Physical Medicine and Rehabilitation which is conducted by the Government of India as the only institute for training post-graduates in physio-therapy and occupational therapy.

I do not have to emphasize the enormity of the speech disorder problem in India, except to state that over six million people in my country, i.e., one and one-half per cent of our total population, have to be helped and helped urgently. With increase in literacy and education, the defects of these patients threaten to become a national problem.

Let me thank you cordially for the interest you have taken in my work and let us hope that the publication of my letters might stimulate a wider interest in the subject.

Mr. Coelho enclosed, with the above letter, copies of letters of recommendation from administrators of hospitals and rehabilitation centers in which he has been employed. Any administrators interested in considering Mr. Coelho as a candidate for a scholarship or grant may obtain these by writing to the *Journal*.—THE EDITOR.

COMING IN THE MAY JOURNAL

1. 'Communication and Purpose—Ingredients for Longevity' by Halbert L. Dunn.
2. 'Covert and Overt Maternal Rejection in Stuttering' by Donald B. Kinstler.
3. 'A Retraining Program for the Adult Who Stutters' by Louise R. Kent.
4. 'The Maximum Auditory Perception (MAP) Word List' by George S. Haspiel and Richard H. Bloomer.
5. 'A Rapid Electrodermal Audiometric Procedure for Testing Adults' by Howard B. Ruhm.
6. 'Hearing and Speech in Follow-up of Left Hemispherectomy' by Robert Goldstein.
7. 'Psychotherapeutic Tools for Parents' by Edward E. Matis.
8. 'A Device for Free-Field Monitoring of Delayed Speech Feedback' by Ross H. Copeland and Norman Halpain.

Other articles, Clinical Forum, and Book Reviews.

BOOK REVIEWS

Ernest H. Henrikson, Editor

NOTE: *Authors whose books are reviewed in the* Journal of Speech and Hearing Disorders *are provided opportunity to comment, if they so desire, on the reviews of their books. Reviews and comments are published together. The Publications Board and the Book Review Editor intend this policy to facilitate informed and balanced book reviewing in the interests of the profession served by the* Journal. *(See* Journal of Speech and Hearing Disorders, *24, 1959, page 425, for the statement inaugurating this policy.)*

BARBARA, DOMINICK A., *Your Speech Reveals Your Personality*. Springfield: Charles C. Thomas, 1958. Pp. 174. $5.50.

This book, as its title states, relates speech and personality. The author draws on the ideas of Karen Horney in describing the make-up of personality, and on the point of view of Korzybski with regard to the need for clear, concrete, accurate speech. The basic ideas of Korzybski (avoidance of allness, avoidance of intentional meanings, avoidance of confusion of the symbol with the referent, etc.) have been stated by Stuart Chase, Wendell Johnson, Hayakawa, and many others, and yet these ideas are so basic to personal and social adjustment that any new statement of these ideas (with new illustrations and new applications) always seems to be useful and worthwhile. This is especially true in the area covered in this book, where speech behavior and personality adjustment are intimately interrelated.

The author first deals with words, emphasizing the many functions and malfunctions of words which go beyond the simple function of conveying clear, concrete meaning. As we look toward primitive man, we see more and more magic use of words, the tendency to confuse or identify the symbol with the referent, and finally the tendency to reify the symbol without regard to the reality of the referent. As Korzybski has said, this is sick language behavior.

Ernest H. Henrikson is Professor of Speech and Director of the Speech and Hearing Clinic at the University of Minnesota.

The author then goes on to discuss personality, and particularly neurotic development in childhood. 'Given a chance and a healthy soil, a child develops normally and will fulfill his growth possibilities. Basically the soil must contain a feeling of genuine warmth, love and respect.' If, however, the child receives indifference or hostility from the parents, he is 'pervaded with a feeling of helplessness, isolation, and hostility, the beginning of a basic anxiety. By way of achieving some form of safety and protection, the child's organism now becomes oriented and is directed toward the adoption of strategic defenses as a protective armor.' In general, as the person grows older, he becomes more and more alienated from his 'real self' and more and more identifies with his 'idealized image.' The defenses are shored up by illogical and improper language behavior.

The author deals with various speech defense mechanisms, starting with the well-known over-compensation of Demosthenes. In the 'Demosthenes Complex' the individual insists to himself that he *must* become a fluent Demosthenes; and when he fails in this, he simply insists that much more—the 'tyranny of the should.' Some speakers react by becoming the self-effacing, timid ones; others react in the opposite direction by becoming the expansive speaker, the master, the bore. Still others try to become the strong, silent type, the resigned speaker, the man of few words.

One of the two most important chapters in the book is Chapter 10, dealing specifically with stuttering. Here the author gives a lucid picture of the cycle that develops: initial weakened ego, speech hesitancy, labeling, emotional reaction connected in part with the labeling, further labeling, further emotional reaction, etc., etc. The author looks at the solution to the problem in terms of the standard psychotherapeutic approach: 'To help himself stutter less, the stutterer must first find and understand himself.'

The other of the two most important chapters is 'Psychotherapy—One Road toward Healthy Growth and Effective Speech.' Here the author gives a very clear picture

of the role of the clinician, and how the clinician assists the patient, ultimately, in viewing himself clearly, realistically, and with genuine understanding.

The author concludes, in the final chapter, that it is essential to talk simply and understand clearly. 'The more man tends toward health and self-realization, the less will he tend toward neurosis, and the more relaxed, spontaneous, spirited, productive and meaningful will be his verbalization.'

CURTIS E. TUTHILL

National Taiwan University

Author's Comment: Many thanks for reviewing a second book of mine in so short a period of time.

Professor Tuthill's review of my book *Your Speech Reveals Your Personality* is a most comprehensive, succinct, and objective summary of the main concepts in the volume. I agree with his evaluating the two chapters on stuttering and psychotherapy as the most important chapters. For those speech clinicians who are interested in knowing further about the psychodynamics of stuttering, and more specifically the handling of speech and hearing problems psychotherapeutically, the material in this book can be of value.

CRUICKSHANK, WILLIAM, and JOHNSON, G. ORVILLE, *Education of Exceptional Children and Youth*. Englewood Cliffs, N. J.: Prentice-Hall, 1958. Pp. 723. $9.25.

'A definitive and penetrating study, the book describes modern practices and scientific techniques in the education of children with various kinds of exceptionality. It traces the historical development of this type of special education, includes a critique of various kinds of programs, and examines in detail all philosophical considerations. The place of the residential school, the special class are also considered.' This summary is taken from the jacket. The same source further states: 'Eleven nationally known educators, all major authorities in their field, have contributed to this volume. These specialists have provided a program which will interest anyone concerned with the mental, physical, and emotional development of exceptional children.'

The purpose of the book, as stated by the editors, is to bring together basic information regarding the education of the major groups of exceptional children in the light of the marked developments in growth of community understanding, advances in technology, development of teacher education centers, and the increasing number of specialist teachers.

The book is divided into four parts. Part I contains three chapters, written by Dr. Cruickshank, which define the problem, examine and justify the need for special education, discuss current educational practices with exceptional children, and define several basic essentials in the development of a program for exceptional children at both the elementary and secondary levels. The rather lengthy introduction includes much historical background information of a personal and contemporary nature.

Part II, Intellectual Differences, consists of three chapters dealing with the education of children with high mental ability, those who are mentally handicapped and those who are mentally deficient. Characteristics, objectives, program modification, and curriculum are discussed in each area of exceptionality. Many educators who are valiant supporters of the ability of the classroom teacher to meet the needs of all children may oppose the strong recommendation for grouping of children with comparable abilities. Likewise, those who strongly advocate a public school program for the mentally deficient 'trainable' child will probably react negatively to the chapter on 'The Training of Mentally Deficient Children.'

Part III, Physical Differences, includes six chapters, one each on the education of children who are partially sighted, blind, who have impaired hearing, speech handicaps, who are crippled, and who have chronic medical problems. Each chapter is written by an authority in each field of exceptionality. The same general pattern is followed as in the chapters on intellectual differences.

Part IV, Emotional Differences, contains one chapter which emphasizes the need for additional research concerning the education of the socially and emotionally maladjusted, and the necessity for differential diagnosis of these disorders.

Part V, Administration, has two chapters concerned with guidance for exceptional children and administration and supervision of special education programs. The administration and supervision are discussed chiefly from the view of the local administrator and supervisor. This part contains little discussion of the responsibilities of either state agencies or residential schools.

The book is a review of the current practices of programs for exceptional children from an educational point of view which

is greatly needed in the field of special education. The different authors point out the major problems and issues in each area of exceptionality. It is an attempt to look at both sides of the problems and issues in special education and does not seem to be biased in its presentation.

As with many books written by a number of people, there is much repetition. The general philosophy of special education is discussed by each author. More thorough editing would have reduced the amount of repetition and retained a basic unity of concept. There are times when excessive verbalism is a handicap. Nevertheless, this is an excellent resource book and the reader, if he wishes, can refer only to chapters of specific interest to him. Much of the material could have been condensed to make a more readable book. Chapters 1, 2, and 3 could be condensed into two chapters. Dr. Connor could combine Chapters 11 and 12 and there is repetition in Chapters 14 and 15.

Of particular importance to the readers of this review are Chapter 9, 'The Education of Children with Impaired Hearing,' by Dr. Charlotte B. Avery, and Chapter 10, 'The Education of Children with Speech Handicaps,' by Dr. Stanley H. Ainsworth.

Dr. Avery has presented the information on Children with Impaired Hearing,' by Dr. which should be easily understood by a lay person and yet should be of value to the speech and hearing clinician. In her introductory statement Dr. Avery briefly states the chief differences between the child with permanently impaired hearing and the child with temporary hearing impairment. Information concerning education of children with impaired hearing is given under the following headings: Psychological and Physiological Characteristics: Evaluation of the Child with a Communicative Problem, Definition and Classification, Effects of Hearing Impairment on Hearing for Speech, Effects of Hearing Loss on Language Development, Psychological Characteristics of the Child with Impaired Hearing, Parents' Reaction to a Child with Impaired Hearing; Educational Programs for Hearing Impaired Children: Parent Education Program, Informal Education During the Preschool Years, Educational Programs for Hard of Hearing Children, Education for Deaf Children (Methodology and Appropriate school placement), Time of Initiation and Termination of Formal Special Education, Teacher Qualifications and Competencies; Developmental Curriculum: Special Needs in the Preschool Years (Auditory training and Speech training), Curriculum for Hard of Hearing Children—Preschool Years; Curriculum for Deaf Children—Preschool Years; Curriculum for Hard of Hearing Children—School Years; Curriculum for Deaf Children—School Years: (Language arts, Speech, Reading, Writing, Arithmetic, Social and natural sciences, Creative art, and Physical education); Special Methods for Teaching Hearing Impaired Children: Hard of Hearing Children (The special teacher or therapist, The classroom teacher, Diagnosis of special needs and grouping, Special equipment for use with hard of hearing children, special techniques for teaching hard of hearing children, Lipreading, and Auditory training); Deaf Children: (Special techniques for parents, Grouping for education, Special equipment for use with deaf children. Special techniques for teaching deaf children, Lipreading, Auditory training, Speech, Language and reading); and Summary.

This reviewer wishes that more time could have been given to a discussion of the regular classroom teacher's responsibility and that of other public school administrative staff. There are excellent illustrations of the speech of children with varying degrees of hearing impairment dating from birth or before acquisition of language. After reading this chapter, a person should certainly have better understanding of children with hearing impairment and the educational implications of a hearing loss.

Dr. Ainsworth's chapter is well-organized and written in simple language which should be understood by the lay reader. The reviewer happens to prefer the term speech problems to speech handicaps, but this is of minor importance. The chapter is 42 pages in length and should be read by all speech and hearing personnel, particularly those working in public schools. It would be excellent required reading for all local school administrators, supervisors, and classroom teachers. In no other part of the book are the major functions of the teacher stated so clearly and concisely. The necessity that the teacher develop self-understanding is emphasized.

The chapter has a brief introductory statement and then discusses Problems of Speech Development; Problems of Articulation; Problems of Voice; Loudness, Pitch, Rate, Quality, Stuttering; Description and Causes; Special Problems: Foreign Dialects, Cleft Palate, Cerebral Palsy, Hearing Loss, Aphasia (Dysphasia), Laryngectomy, Stage Fright; The Speech Correctionist; Correcting Speech Defects, Organizing and Administering the

Speech Correction Program; Helping the Speech Correctionist; The Teacher's Function: Basic Attitudes for Helping Children Who Have Speech Problems, Adaption to Specific Problems, What the Teacher in the Classroom Can Do to Help Speech (Articulatory problems, Stuttering, etc.), What the Classroom Teacher Should Not Do, and Summary.

Space limits a thorough discussion of the contributions of the various authors and makes it impossible to do full justice to this excellent book. Although lengthy, it contains a wealth of material and certainly achieves its purpose to provide a comprehensive overview of the current thought on education of children with physical, intellectual, and emotional differences. Bibliographies and selected supplementary readings provide a wealth of reference material. This book should be required reading for all people in the field of special education. It provides excellent resource material both for them and for people in allied professions.

MAMIE J. JONES

Georgia State Department of Education

Editor's Note: This review was sent to the author, but no comment was submitted.

POLLOCK, MORRIS P., and POLLOCK, MIRIAM S., *The Clown Family Speech Book*. Springfield: Charles C. Thomas, 1960. $6.50.

Speech clinicians who utilize motivational materials in articulation therapy will welcome the addition of *The Clown Family Speech Book* to their professional libraries. Speech improvement activities are based upon incidents in the home life of a family of clowns, which includes the father (Toto), mother (Lulu), daughter (Mimi), son (Pepi), and baby (Gigi). Interesting episodes are presented in story form to capture the interest of children with speech handicaps and to induce them into sugar-coated practice. Among these are 'The Ice Cream Tree,' 'The End of the Party,' and 'A Picnic at the Farm.'

The book is attractively and imaginatively assembled. The full-page drawings would be more effective in color, but application of crayons will remedy this deficiency. The last 38 pages constitute a workbook which may be purchased separately. For children whose developmental level is within the primary grades, this book should provide excellent material. The authors, who have a school in Brookline, Massachusetts, display skill in appealing to their potential readers and listeners.

MORRIS VAL JONES

California School for Cerebral Palsied Children

Author's Comment: Since the establishment of the Pollock School, Inc., in 1934, we have worked closely with children whose development, both academically and socially, has been retarded because of speech disorders. Greatest success has been achieved when these children were reached from the ages of four to nine. Our approaches are geared to their levels of interest and social development.

The Clown Family Speech Book is composed of (a) the story, (b) the teacher's manual, (c) the workbook. This is the first speech book to be written with an accompanying workbook. As the child completes each exercise, the teacher is able to (a) emphasize the basic aims of each chapter; (b) check the child's comprehension; and (c) give the child opportunity for participation, encouraging vocalization. Exercises are included to promote correct inhaling and expelling of breath, establish rhythmic pattern of speech, and activate spontaneous responses.

Information for Contributors to the Journal of Speech and Hearing Disorders

The *Journal of Speech and Hearing Disorders* publishes articles concerning clinical research, case studies, remedial procedures, counseling and re-education methods, and related matters in the field of speech pathology and audiology. Manuscripts and correspondence pertaining to them should be addressed to:

Mary Huber, Ph.D., Editor
Journal of Speech and Hearing Disorders
Los Angeles State College
Los Angeles 32, California

Receipt of each manuscript is acknowledged by card or letter. A manuscript judged suitable for consideration for publication in the *Journal* is submitted to an associate editor who is qualified to review the type of article concerned. The associate editor may correspond directly with the author to discuss desirable changes in the manuscript. After the associate editor's recommendations have been received by the editor, the editor of the *Journal* may (a) submit the article to other staff members for examination, (b) return it to the author with suggestions for revision, (c) return it to the author with reasons for rejection, or (d) accept it for publication.

When an article is based on a thesis which satisfies part of the requirements for an advanced degree, the adviser's statement approving publication of the material in its present form should accompany the manuscript or be sent to the editor by the adviser. Consideration for publication follows receipt of this statement.

Several weeks before the date of publication, galley proofs are submitted to the author for his approval. An order blank for reprints and statement of costs for figures and tables, if any, are also sent at this time. All standard materials are printed at no expense to the author. The author pays the cost of reproducing tables and figures. For tabular matter the cost is 59 cents a column inch; for figures the cost is $1.90 up to six square inches and 15 cents for each additional square inch. Reprints of a four-page article, for example, cost $12.40 for 100 copies or $19.50 for 1000 copies. Additional cost of any rewriting by the author after the article is in galley form is based on labor cost of $7.85 an hour.

Manuscripts

The author is asked to submit two copies of the manuscript, an original and a carbon, typed, double-spaced, on 8½" x 11" bond paper, with the author's last name and page number in the upper right-hand corner of each page. The author should keep a carbon copy of the text and duplicates of all figures for convenient reference in correspondence involved in editorial processing.

Author Identification. In a paragraph alone on page one, the following information is given: (a) author's name; in parentheses, highest degree with institution and year; formal title in present position and name of the institution where position is held or, if there is

no institutional association, a street address; (b) if the manuscript is based on a thesis, the advanced degree and name of the adviser; (c) sponsor of meeting, place, and year if the article is adapted from a paper presented at a meeting; (d) name of the grantor if the study was supported by a grant in any part.

Text. At the top of page two the title is typed flush left with the important words capitalized. Below the title, also flush left, is the author's name. The first line of the first paragraph of the text begins flush left, but succeeding paragraphs are indented.

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Key to References. Within the text the appropriate reference numbers are underlined in parentheses following the surname of the author or, if the author's name is not mentioned, following the related statement. If the reference is a book, the numbers of the relevant pages or chapters should be included but not underlined, for example, 'Excess mucous usually accompanies a growth and increases the hoarseness (*14*, pp. 664-666).'

Footnotes. When a footnote is necessary, reference to it is indicated by a numerical superscript following the related word or sentence. The superscript corresponds with consecutive footnote numbers. The footnote is inserted immediately below the line in which the superscript occurs. Solid lines above and below the footnote separate it from the text of the manuscript.

Summary. An objective condensation of the article is presented under the first-level heading *Summary*. Summaries of research studies and important articles on theory or methodology should indicate procedures, findings, and conclusions. For publication in the *National Index on Deafness, Speech and Hearing*, abstracts of nonresearch articles should not exceed 200 words and abstracts of research or important articles on method or theory should not exceed 400 words. Within these limitations the author should see how brief his summary can be and still contain all the necessary information.

In addition to the English summary, writers are encouraged to provide the summary in Interlingua, the international auxiliary language. Assistance in translation is obtainable from Science Service, Interlingua Division, 80 East Eleventh Street, New York 3, N. Y.

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Phonetic symbols are enclosed in square brackets and phonemic symbols in diagonal lines. If obtainable, a phonetic typewriter should be used.

Single quotation marks are used for primary quotations and double quotation marks for quotation within a quotation. Quotations of four lines or more are indented without quotation marks, left margin in alignment with regular paragraph indentation.

One-digit integers are spelled out except in tabular matter. Arabic numerals are used for other numbers.

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Items in a list are referred to by a, b, c, . . . in parentheses. A comma is inserted before *and* in series of three or more.

Such terms as *speech clinician, speech pathologist, speech correctionist, speech consultant, speech specialist, speech counselor,* or *remedial speech instructor* are used to denote workers in speech pathology. In many contexts the term *speech therapist* implies a more restricted scope of competence and a lower level of professional qualification than would seem to be intended or appropriate. With due sensitivity to the situation in which they are applied, *patient, case, client, pupil, student,* or other terms are used to refer to the person being served. Such terms as *defective, speech defect,* and *speech defective child* should be avoided.

Acknowledgment. If individuals who have not been listed as authors contributed substantially to the study, their assistance is acknowledged in a brief statement under a first-level heading *Acknowledgment* following the *Summary*.

References. On a page separate from the text the references used are listed under the first-level heading *References* and numbered in the alphabetical order of authors' surnames. Abbreviations follow the style of the *World List of Scientific Periodicals,* which is available in the reference section of most public libraries. When the correct abbreviation is not available, the complete name of the periodical should be given. Titles should appear the same as in the original publication. All references are checked against library sources by the *Journal* staff. Incomplete or inaccurate information in a manuscript may cause delay in publication. A recent issue of the *Journal* should be consulted for style of reference listing.

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Authors are invited to contribute to the section entitled 'Clinical Forum.' Brief items such as case histories, new uses for special materials, devices, instruments, or equipment; notes on clinical speech and hearing services; and other information on clinical matters are of interest to *Journal* readers. The title and presentation should be brief and to the point. On the first page the title is typed flush left and the important words are capitalized. The first line of the text is indented. First-level subheads are indented, underlined, and followed by a period. The second-level heading is the same except that it is not underlined. In each case the text continues on the same line as the heading. Below the end of the article, the author's name is typed flush right; on the line below the author's name, the name of the institution with which he is affiliated or his address is typed flush left. Forum contributions are submitted to the editor of the *Journal*. References and footnotes should be avoided; such information, if necessary, should be incorporated in the body of the article or placed in parentheses.

Book Reviews

Persons interested in reviewing books within their special area of interest or background of experience are invited to correspond with the book review editor:

Ernest H. Henrikson, Ph.D.
Speech and Hearing Clinic
University of Minnesota
Minneapolis 14, Minnesota

Fillers

Readers are encouraged to submit appropriate excerpts from other publications for insertion as fillers in the spaces following *Journal* articles. Each quotation should be copied exactly as printed in the original publication. The source is indicated in parentheses at the end of the quotation, for example, (From J. Tait, 'Is All Hearing Cochlea?' *Ann. Otol., etc., St. Louis,* 41, 1932, 681-705) or (From C. Van Riper, *Speech Correction Principles and Methods* (3rd ed.). New York: Prentice Hall, 1954, p. 3). The Journal staff will request permission to quote the material from the author and publisher.

Examples of Manuscript Form

AUTHOR IDENTIFICATION PARAGRAPH

John Doe (Ph.D., Western University, 1959) is Associate Professor of Audiology, Western University. This article is based on a paper presented at the 1960 convention of the American Speech and Hearing Association in Los Angeles. The investigation was supported in part by Research Grant X-516 from the the National Institutes of Health, Public Health Service.

FIRST PAGE OF TEXT (Page 2)

Radiography in Speech Pathology

Samuel G. Fletcher

Ralph L. Shelton, Jr.

Carlisle C. Smith

James F. Bosma

Much of the recent research on the anatomy and physiology of the structures used in speech has depended upon radiography as a fundamental method of investigation (10, 16, 19, 25, 28, chap. 2) . . .

FIRST-LEVEL HEADING

Clinical Implications

As a result of these findings it is suggested that clinical audiologists use conductively deafened subjects as one means of

SECOND-LEVEL HEADING

Audiometric Findings. An audiometric description of each of the 15 subjects used in this study is shown in Table 1. Seven subjects

THIRD-LEVEL HEADING

Consonant Blends. Figure 3 shows the percentages of correct consonant blend responses for each age group. The range of total correct

KEY TO REFERENCES

Other studies show a positive relationship between articulation errors and intelligibility (6, pp. 71-78, 13, 20). Wood (17), in a

FOOTNOTE

If the subject's unadapted threshold is measured by conventional audiometry,[1] each audiometric stimulus should be one or two seconds

[1]Various techniques of pulse-tone audiometry are justifiable in terms of the considerations reviewed here. However, discussion of these techniques is beyond the scope of this article.

long and should follow a silent interval of at least three seconds.

SUMMARY

Two sibling cases of congenital aphasia are reported who were diagnosed as having phenylketonuria. During three years of control on a phenylalanine-low diet, there was noted marked improvement in language as well as in functional mentation. Of particular interest

was the fact that the diet was not initiated until the subjects were four and three years of age, respectively. It is suggested that speech pathologists be aware of phenylketonuria as a cause of delayed language development in children who otherwise may appear near normal.

ACKNOWLEDGMENT PARAGRAPH

Acknowledgment

The authors are grateful to Professor R. W. Henry for his guidance in this study and to Dr. J. D. Long for his assistance in tabulating the data.

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TABLE

Table 1. Subjects tested, grouping of subjects, and degree of hearing loss of subjects in Group II distributed according to age in months.

Age in Months	Subjects Tested	Group I	Group II	Hearing Loss of Subjects in Group II (Ears)		
				Mild	Moderate	Severe
100-105	1	0	1	2		
94-99	2	0	2	1		
88-93	3	0	3			2
82-87	3	1	2		2	
76-81	5	0	5			2
70-75	9	2	7	2		
64-69	6	1	5			
58-63	10	0	10	2		
52-57	8	1	7	3	1	2
46-51	4	1	3			
40-45	4	1	3		2	
34-39	2	1	1		2	
28-33	1	1	0			
Total	58	9	49	10	7	6
Percentage		16	84			

FIGURE LEGENDS

Figure 1. Patient wearing a chin cradle to limit mouth opening and tongue thrust.

Figure 2. Composite curve obtained by Vannus computer from nine subjects showing evoked response to clicks presented every 63 msec.